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AFRICA PILOT.

PART I.

NORTH ATLANTIC ISLANDS
&
CAPE SPARTEL TO RIVER CAMEROON
1885

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PART I.

NORTH ATLANTIC ISLANDS
&
CAPE SPARTEL TO RIVER CAMEROON
1885

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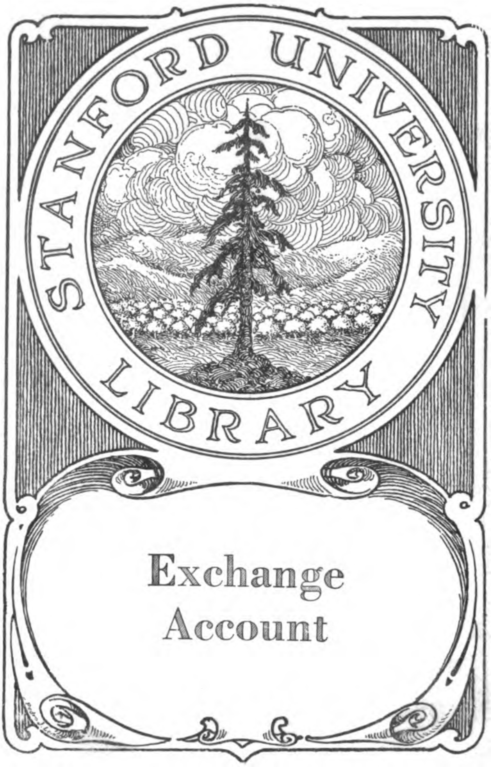

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AFRICA PILOT,

OR

SAILING DIRECTIONS

FOR THE

WEST COAST OF AFRICA,

PART I.

FROM CAPE SPARTEL TO THE RIVER CAMEROON,

INCLUDING

THE AZORES, MADEIRA, CANARY, AND CAPE VERDE ISLANDS.

PRESENTED BY HER BRITANNIC MAJESTY'S GOVERNMENT
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ADVERTISEMENT TO THIRD EDITION.

THE Third Edition of the Africa Pilot, Part I., comprises Sailing Directions for the West Coast of Africa, from cape Spartel to the river Cameroon, including the Azores, Madeira, Canary, and Cape Verde islands.

These directions have been compiled from the remarks made by Captain Vidal; Commanders Boteler, Belcher, Denham, Allen, Lieutenants Arlett and Owen, of the Royal Navy; the several Admiralty surveys executed between 1821 and 1846 having been conducted by those officers. The Instructions Nautiques sur la côte occidentale d'Afrique, parts 1 and 2, 1870–71, have further been consulted, as also the Remark Books of officers of Her Majesty's ships to the present date.

This Edition has been prepared by Navigating Lieutenant W. R. Martin, R.N.

Officers of the Royal Navy and Mercantile Marine are requested to transmit to the Secretary of the Admiralty notice of any errors or omissions they may discover in this work.

F. J. E.

Hydrographic Office, Admiralty, London,
January 1880.

ADVERTISEMENT TO FOURTH EDITION.

THE Fourth Edition differs only from the Third by the inclusion of an appendix.

This appendix contains much valuable information on the Oil rivers, from the surveys and remarks of Lieutenant A. M. Field, R.N., 1881–82: also other information received since the publication of the Third Edition in 1880, including corrections to the lights referred to in that work.

Alterations in the limits of the charts referred to throughout the work will be found in the index chart facing page 1.

W. J. L. W.

Hydrographic Office, Admiralty, London,
May 1885.

S.O. 10624. Wt. 24140.

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IN THIS WORK THE BEARINGS ARE ALL MAGNETIC EXCEPT WHERE MARKED AS TRUE.

THE DISTANCES ARE EXPRESSED IN SEA MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO 100 FATHOMS.

THE SOUNDINGS ARE REDUCED TO LOW WATER OF ORDINARY SPRING TIDES.

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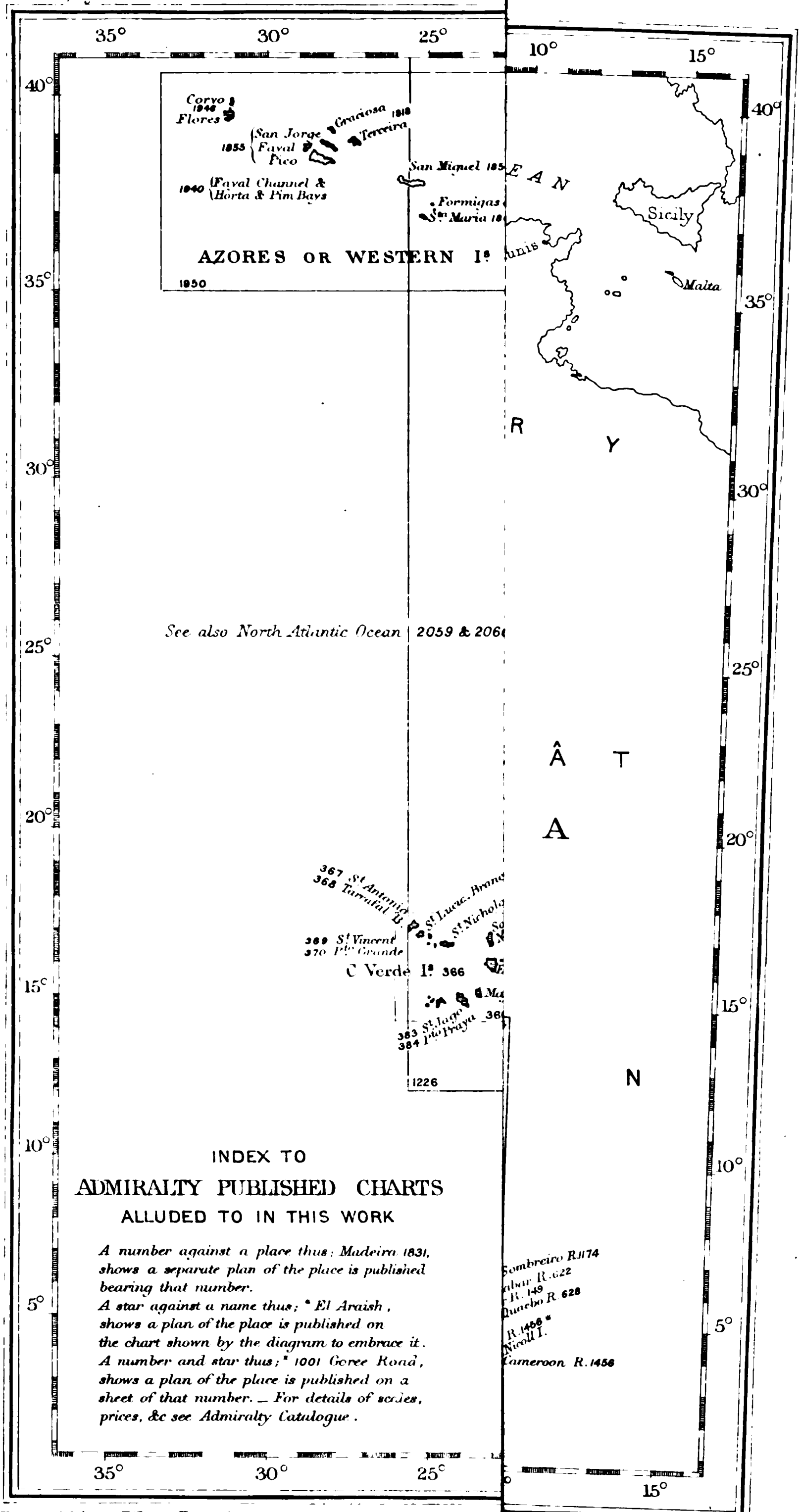

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No. 6 B Africa Pilot, Part 1.

Engraved by Davies & Company

AFRICA PILOT.

PART I.

CHAPTER I.

OBSERVATIONS ON PASSAGES, WINDS, AND CURRENTS, BETWEEN ENGLAND, THE CAPE OF GOOD HOPE, AND WEST COAST OF AFRICA; WITH A DESCRIPTION OF THE AZORES, OR WESTERN ISLANDS.

VARIATION in 1880.

Entrance of English channel	20° 40′ W.	Azores.—Fayal island	25° 45′ W.
Azores.—St. Mary island	24° 30′ W.	——— Flores island	26° 45′ W.

ENGLAND to the CAPE of GOOD HOPE.* — A sailing vessel on leaving the English channel should at once make westing, as the prevailing winds are those from that direction. From the Lizard, with a fair wind, a W.S.W. course should be steered to gain an offing in long. 10° or 12° W., so as to be able to weather Ushant should the wind become adverse. If the wind veers to the westward, the vessel should be hauled to the wind on the tack which will best enable her to approach the proper course, without being drawn into the bay of Biscay, which is especially to be avoided. Rather than run any risk of this, it will be better to make a long board to the westward, in which a vessel may be assisted by the Rennel current; and since westerly winds generally veer to N.W., if a good offing has been made, the course can afterwards be pursued a point or two free, making allowance for a south-easterly set.

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* *See* Admiralty charts.—North Atlantic ocean, general, No. 2,059; North Atlantic ocean, eastern portion, No. 2,060*a*; South Atlantic ocean, general, No. 2,203; South Atlantic ocean, eastern portion, No. 2,202*a*; also Admiralty Pilot charts for Atlantic ocean, 1875 (corrected to 1878).

From long. 10° or 12° W. a course should be shaped to pass Madeira at any convenient distance. In the winter months it is preferable to pass westward of it, for the strong westerly gales which occur in November, December, and January produce eddy winds and heavy squalls eastward of the island. From Madeira the track recommended is to pass to the westward, (and just in sight of), the Cape Verde islands, as the winds are stronger and steadier to the westward than to the eastward of them. The equator should be crossed at points varying according to the season of the year.*

When in the vicinity of St. Paul rocks, astronomical observations should be frequently taken, the current watched and allowed for, and a good look-out kept, as these rocks are steep-to, and can only be seen on a clear day from a distance of about 8 miles. The same precautions are necessary if passing westward of Fernanda Noronha, when approaching that dangerous reef the Rocas.

When the south-east trade wind is met with, a vessel may stand on the tack which gives most southing, although experience proves it is advisable to keep on the port tack, even should the vessel fall off to W. by S., for the wind will draw more to the eastward as the vessel advances, and finally to East at the southern limit of the trade. Vessels, in proceeding to the southward in the south-east trade, generally sight the island of Trinidad to test the rate of their chronometers, and to take a fresh departure. During the greater part of the year the south-east trade fails on a line drawn from the Cape of Good Hope to the islands of Trinidad and Martin Vaz. This limit varies about 3°, according to the position of the sun.

A vessel, when to the southward of the south-east trade, will meet with fresh winds variable in direction. Those from N.E. through North to N.W., if accompanied by cloudy weather, often shift suddenly to S.W. or South, but sometimes the wind steadies between West and W.S.W. From Trinidad island a course should be shaped to the south-eastward to cross the parallel of 30° S., in about long. 22° W., and the meridian of Greenwich in about lat. 35° to 37° S., whence to the Cape of Good Hope winds from the westward and southward usually prevail. After passing the meridian of Greenwich, a strong northerly current will frequently be experienced; and on nearing the land, when bound to Table bay, great attention is required, as there it will be found almost constantly running strongly to the northward, and, if disregarded, a vessel may have difficulty and lose time in reaching the bay. If bound to Simon's bay during the southern summer months, it will be better to make the land about cape

---

* *See* page 3.

Hangklip, as a strong current sets at that period across the entrance of False bay towards Cape point.

Caution.—Under any circumstances, at night, there is great difficulty in judging the distance of lights situated under high land. Therefore, the prudent course for a stranger to pursue when making Table bay is to keep off and on until daylight, sufficiently to the westward of Green point to prevent being becalmed near the land and set in upon the coast by the heave of the sea.

For full directions when making the land near Table bay, the mariner is referred to "Africa Pilot," Part II., p. 248.

Routes across the Equator.*—Vessels crossing the equator from north to south are recommended to pursue the following routes varying according to the season of the year.

In January, though exceptionally good sailing vessels make good passages by crossing in 30° W., or even west of that meridian, it is not generally advisable to cross the equator west of 26° or 27° W.

In February, March, and April, after passing the Cape Verde islands, vessels should stand to the southward in 26° W., and when southerly winds are met they should keep on the tack which gives most southing, endeavouring to cross the equator not west of 28° W.

In May it is recommended to cross not west of 25° W.

In June, after meeting with southerly winds (probably in lat. 6° N.), it is advisable to keep on the starboard tack, if any southing can be made, until a sufficient amount of easting has been made to admit of crossing the equator in 25° W.

In July vessels are recommended to cross not westward of from 25° to 28° W. longitude.

In August the requisite easting should be made when southerly winds are first met, and the equator crossed in about 23° W.

In September it is recommended to cross not west of 26° W.

In October the longitude of 28° W. is recommended as the extreme westerly limit in crossing.

In November and December, after passing the Cape Verde islands, it is advisable to haul somewhat to the eastward, so as to be in 25° W. long. when in 6° N. lat., and endeavour to cross the equator not west of 29° W.

When proceeding across the equator from south to north, at all seasons of the year, vessels are recommended to keep between the meridians of 25° and 30° W., except in July, when those approaching from the south-eastward should cross between the meridians of 20° and 25° W. In July and August those approaching from the south-eastward should endeavour to cross the parallel of 10° N. in 25° W.

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* From "Remarks to accompany monthly charts of meteorological data for nine 10° squares of the Atlantic which lie between 20° N. and 10° S. lat. and extend from 10° W. to 40° W. long."—Published by authority of the Meteorological Committee, London, 1876.

In July, vessels approaching the equator from the south-westward, are advised to cross in 30° W.

Cape of Good Hope to St. Helena.—On leaving the Cape of Good Hope with a steady southerly wind, it is desirable to get an offing as soon as possible; a N.W. by N. course should be made for some time, as squalls from N.W. and W.N.W. are not unfrequent when near the coast, and have been experienced in both seasons.

Having obtained a moderate distance from the coast, the course may be shaped for St. Helena. If the wind blows strongly and veers to E.S.E., an allowance for a lee current should be made, particularly in cloudy weather, when the longitude cannot be correctly ascertained; then it will be prudent, if wishing to call at St. Helena, to get nearly on the parallel of that island, at some distance to the eastward; but if the longitude be known, the island may be made on a north-west bearing.

St. Helena to England.—From St. Helena, a direct course may be steered for Ascension, as on this passage the south-east trade wind is generally steady, and a westerly current is experienced.

The island of Ascension may be passed at a convenient distance on either side, but vessels usually pass westward of it, at a distance of about 10 or 20 miles. After crossing the equator* a northerly course may be made, in order to reach the north-east trade as soon as possible; but if variable and light breezes continue far to the northward of the equator, the Cape Verde islands should be given a berth of 200 miles. Having entered the north-east trade, the vessel should be kept well full, so as to get quickly across it to the north-westward.

When the northern limit of the north-east trade wind is reached, the vessel will probably be in about 26° or 28° North latitude, and from 38° to 40° West longitude, where westerly winds may be expected.

It is seldom advisable to pass eastward of the Azores; the better course is to pass westward of them, or, should the wind draw to the N.W. when near the islands, the most convenient channel through them may be selected.

From April to July if vessels are passing the Azores as far westward as 40° W., when in about the 40th parallel of latitude, a look-out should be kept for ice, as, though it is very unusual for icebergs to be so far to the southward and eastward, yet instances have been recorded.

If easterly winds are experienced after passing the Azores, it will be more advantageous to keep on the starboard tack, and make northing, as westerly winds will probably sooner be found.

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* *See* page 3.

STEAM ROUTES.—The course adopted by steam vessels carrying mails from England to the Cape of Good Hope is to make a direct passage, as described in the next paragraph. Some have succeeded in accomplishing the voyage in less than 20 days.*

Outward passage.—Ushant is, if possible, sighted and passed within 10 miles and cape Finisterre is passed at about the same distance; from thence a direct course is steered for Madeira, passing generally east of Porto Santo.

From Madeira the track lies west of Salvage islands, through the Canary group, between Gomera and Tenerife. A course is then shaped to skirt, as nearly as circumstances will permit, the shoals off cape Blanco, and parallel to the coast to cape Verde, continuing to the southward along the land, passing Bijouga islands and St. Ann shoals at a prudent distance. The equator is crossed in about 9° W., whence the passage is made to the Cape of Good Hope direct, or calling at Ascension and St. Helena.

During the season when S.E. gales occur (January—March), vessels of moderate power make the land to the southward of Table bay.†

Homeward passage.—The route followed when proceeding from the Cape of Good Hope to England is nearly the reverse of the above. When among the Canary islands, if the north-east trade blows strongly between Tenerife and Palma, it is desirable in a vessel of moderate power to stand westward of Palma under fore and aft sails; and when nearing the English channel, Ushant should be sighted.

England to West Coast of Africa.—In a steam vessel the first part of the passage will be similar to that recommended when proceeding to the Cape of Good Hope. If the Canary islands are to be visited, the vessel should pass eastward of Madeira, and a course shaped for Tenerife, passing, if possible, west of the Salvages. When amongst the Canary group the wind generally blows from N.E. to North.

After leaving Tenerife, a S.W. ½ S. course should be made till the lat. of 20° N. is reached, when cape Verde may be steered for; if necessary to make the land at night, the lead should be used frequently and with great care.

SAILING ROUTES. — A sailing vessel proceeding from the English channel to the west coast of Africa should at first pursue a course similar to that recommended for sailing vessels bound to the Cape of Good Hope. If desirous of touching at the Canary islands, a course to the eastward of Madeira should be adopted, and Tenerife steered for, there being no danger to apprehend on this route but the Salvage islands. If the course westward of Madeira be adopted, Palma or Ferro, the westernmost of the Canaries, will probably be made, when the position of the vessel can be verified.

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* In December 1875 the *America* made the passage from Table bay to Plymouth in 22 days 6 hours, and in March 1876 the return voyage was accomplished by the same vessel in 22 days 3 hours. In October 1877 the *German* made the passage from Plymouth to Table bay in 19 days 8 hours; and in September 1879 the *Pretoria* made the shortest passage on record from Table bay to Plymouth in 18 days 13¼ hours.

† Information received from Union Steamship Company, 1879.

If bound to Senegal river or Gorée, it is advisable to make the land near cape Blanco; a vessel may then proceed along the coast for her destination.

Vessels of war proceeding to join the west coast of Africa squadron, should in all cases call at Sierra Leone to obtain Kroomen, and complete water. From November to April the best passage is that east of the cape Verde islands, keeping well over to the African shore. After May the south-west monsoon renders this passage less advantageous, and the north-east trade is kept longer by passing westward of the Cape Verde islands; after losing the north-east trade the wind will be from the southward and the current easterly, so that Sierra Leone may be reached at once on the starboard tack.

Sierra Leone to Ascension.—After leaving Sierra Leone and clearing St. Ann shoals, a sailing vessel should run along the coast within 50 miles of the land, until south of cape Palmas; whence an endeavour should be made to cross the Equator in from 3° to 8° West longitude, and then, without making a tack, Ascension will be fetched, probably, after a passage of 15 or 16 days under sail from Sierra Leone.

During the month of November long continued calms and a current setting strongly to N.W. are experienced in the vicinity of St. Ann shoals.

Ascension to the coast. — From Ascension a sailing vessel should fetch the coast of Africa on the starboard tack in from 13 to 15 days, but at various points, from cape Lopez as far to windward as St. Paul de Loando, or even farther southward, according to the season of the year; in the month of May the wind generally keeps more to the eastward than at other times, and a vessel will not weather Anno Bom island, but under ordinary circumstances a good sailing vessel carrying a press of sail will fetch to windward of the Congo.

Two precautious are, however, requisite; first, not to pass northward of 3° or 4° South latitude; and secondly, not to bring the port of destination to bear to the southward of S. 35° E. (true); an occasional short tack, as the wind veers a little, may therefore be necessary, but the whole passage may sometimes be made with the wind free.

Ascension to St. Helena. — To reach St. Helena from Ascension a sailing vessel should keep at first on the port tack to make southing, after attaining the polar limit of the south-east trade, easting should be made and the trade re-entered, sufficiently far to windward to ensure reaching St. Helena on the starboard tack; this passage averages 18 days.

Bight of Benin to Ascension and back. — In making the passage from the bight of Benin to Ascension, vessels should keep on the starboard tack as far as the equator, when they will generally weather St. Thomas island. They should then tack, and although one or two degrees of northing may be made at first on the port tack, they will be sure to come up again on drawing to the westward out of the bight. When on the port tack, however, care should be taken not to pass beyond the limits of the equatorial current, whose average northern boundary between the meridians of Greenwich, and 5° E., is about lat. 1° N.

When returning from Ascension to the bight of Benin or Cape Coast castle, the wind favours in a similar manner, veering gradually round to South and S.W. as the coast is approached, and any part of the bight may readily be reached.

A good sailing vessel can make the passage from Ascension to Cape Coast castle in a fortnight. On the equator, in long. 7° West, the Equatorial current has been found setting to the westward with a velocity of from 20 to 50 miles per day, and the Guinea current on the meridian of Greenwich and in lat. 2° N. sets to the eastward at the rate of from 20 to 50 miles per day. In the month of May S.W. winds are occasionally not met until in sight of cape Three Points; during this month heavy rain tornadoes occur at night.

Princes Island to Ascension.—This passage may generally be made by standing out from Princes island on the port tack, and as the vessel advances to the westward she will come up so as to fetch Ascension without tacking. Sometimes, though rarely, a north wind will blow in the vicinity of Princes island for a day or two at a time about the middle of April.

Bight of Benin to St. Helena.—A steam vessel leaving the bight of Benin should cross the equator in long. 5° East; aided by steam the lat. of 7° South on that meridian should be reached before standing across on the port tack, when the island will probably be made about 15 miles to leeward.

River Congo to St. Helena or Ascension. — Vessels of war usually make a direct course under steam and sail until the south-east trade is met. Southerly and south-west winds may generally be expected to prevail until the vessel is about 500 miles south-west of the Congo, but between April and June the trade wind is met at a distance of 300 miles in that direction.

Sierra Leone to England.—A vessel should stand to the north-westward from Sierra Leone and, passing west of Cape Verde islands, follow the sailing track from the Cape of Good Hope to the English channel.

Bight of Biafra to Sierra Leone or England.—Vessels bound to the westward from the northern part of the bight of Biafra should, if possible, pass west of Fernando Po, make all the southing they can, and, passing (as the wind may permit) on either side of Princes island, cross the equator as soon as possible, unless the vessel lies up as high as W.N.W. On the east side of Princes island the current sets to the southward, but on the west side of that island to the eastward; southward of the equator the Equatorial current runs to the westward, and, as westing is made, the wind veers gradually round to S.E. When in about longitude 10° W. the equator may be recrossed, and a course shaped for Sierra Leone, or if proceeding to England the sailing track from St. Helena to England should be followed.

WINDS.—Variable winds prevail in both hemispheres beyond the polar limits of the trade winds. In the North Atlantic ocean, when the sun is in the northern hemisphere, the prevailing westerly winds are S.W. and W.S.W.; if, on the contrary, the sun is in the southern hemisphere, they are more frequently experienced from W.N.W. and N.W. This latter period is that of gales and bad weather between North America and Europe. In the English channel easterly winds prevail in February, March, April, and part of May; during the other months of the year westerly winds predominate.

In the South Atlantic ocean the westerly winds vary from N.W. to S.W., but they are changeable and irregular. In the zone between the parallels of 28° and 35° S., the winds which are most frequently met between September and May are those from N.E. through north to N.W.; and from N.W. through west to S.W., principally during June, July, and August.

Trade winds.—The average polar limit of the north-east trade wind in the Atlantic ocean extends to the parallel of 27° North, while that of the south-east trade lies on a line between the Cape of Good Hope and the islands of Trinidad and Martin Vaz. These limits vary about 3° north or south with the position of the sun. The equatorial limits of these winds generally vary in the same manner; that of the north-east trade travelling from 13½° N. in August to 2½° N. in February, on the meridian of 25° W.; while that of the south-east trade changes from 12° N. to 1½° N. between the same months and in the same longitude. The equatorial limit of the north-east trade wind verges, according to the season, more or less towards the equator; but it seldom passes southward of it; the south-east trade wind, on the contrary, occasionally extends as far as 10° N. on the meridian of 30° W. during the month of August. Between the equatorial limits of the north-east and south-east trade winds extends the zone or belt of calms and light airs named the "Doldrums." This zone is narrowest in February and broadest in August, averaging 100 miles in the former month and 300 miles in the latter. When the sun is in the southern hemisphere, and at its greatest distance from the equator, the north-east trade wind inclines more to the northward, and stronger winds are experienced than at any other time. If the sun be in the northern hemisphere the north-east trade inclines more to the eastward.

During the northern summer the trade-wind region is sometimes entered before reaching the latitude of Madeira; this occurrence is, however, exceptional. Between the months of November and March the variable winds of the temperate zone occasionally extend as far south as lat. 20° N.

The north-east trade wind varies considerably in its direction when under the influence of the land, and to the eastward of long. 25° W., when within 400 or 500 miles of the coast of Africa, it blows more from the northward than it does in the open ocean. Between the Canary and Cape Verde islands during the northern summer months, it blows from N.N.E. to N.E. for half the time; and during the winter months, from January to March, the wind in the neighbourhood of cape Verde occasionally draws to the N.W.

It will be seen that the most favourable time for crossing the line will be from December to June, when the passage will be less interrupted by calms, squalls, and variable winds.

Sometimes the north-east and south-east trade winds meet, generally somewhere about the meridian of 28° or 33° west, where a vessel may pass in a squall from one trade to the other.

South-west monsoon.—In the gulf of Guinea, as far north as cape Palmas, the prevailing winds are south-west and southerly; between the latitude of cape Palmas and that of cape Roxo south-westerly winds prevail between June and September and north-easterly winds during the other months of the year; in the latitude of Sierra Leone this south-west wind extends from the shore to long. 32° W. in the middle of the northern summer.

During the fine season land and sea breezes prevail with great regularity near the coasts and islands lying within the tropics.

Harmattan.—On the west coast of Africa, between cape Verde and cape Lopez, a very dry easterly wind, known as the Harmattan, sometimes blows in December, January, and February; it occasionally lasts five or six days, and has been known to continue as long as a fortnight, blowing with moderate force. It is always accompanied by a thick haze, which is experienced as far as 12 or 15 miles from the shore.

From Sierra Leone northward its direction is from E.S.E.; on the Gold coast N.E., and at cape Lopez N.N.E.

Tornadoes.*—Tornadoes are violent gusts of wind of short duration blowing off shore, peculiar to the west coast of Africa, and are generally most frequent at the commencement and termination of the rainy season. Their approach is generally indicated by a well-defined and regular arch of dark clouds, from which thunder and lightning constantly proceed.

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* *See* page 300.

As a rule the rainy season on that part of the coast north of the equator commences when the sun crosses the zenith from south to north and terminates when it re-crosses the zenith; the remainder of the year comprising the fine season.

BAROMETER.*—The average range of the barometer in the higher latitudes (60°–50° N.) is about 1·5 inches, but on extraordinary occasions ranges of 2·75 and 3 inches have been recorded.

In the intertropical regions the range varies from 0·4 to 0·2 inches, and in the neighbourhood of the equator it seldom exceeds 0·15 inches, this small change being due in great part to a regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a warning of the approach of bad weather. The fall of the barometer in hurricanes ranges from 1·0 to 2·0 and even 2·5 inches, the rapidity of the fall and the depression of the mercury increases as the centre of the storm approaches.

In the northern hemisphere the effect of the veering of the wind on the barometer is according to the following law:—

With East, S.E., and South winds the barometer falls.
„ S.W. winds the barometer ceases to fall and begins to rise.
„ West, N.W., and North winds the barometer rises.
„ N.E. winds the barometer ceases to rise and begins to fall.

While in the southern hemisphere the effect is as follows:—

With East, N.E., and North winds the barometer falls.
„ N.W. winds the barometer ceases to fall and begins to rise.
„ West, S.W., and South winds the barometer rises.
„ S.E. winds the barometer ceases to rise and begins to fall.

By the knowledge of the barometric pressure at a number of places 100 or 200 miles apart, we may know with considerable certainty, a few hours in advance, from which direction the wind may be expected to blow at any place, according to a law discovered by Professor Buys Ballot, and bearing his name. The rule is, "Stand with your left hand towards the place "where the barometrical reading is lowest, and with your right hand "towards that where it is highest, and you will have your back to the "direction from which the wind may be expected to blow."

This rule applies to the northern hemisphere, but must be reversed in southern latitudes.

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* *See* small charts, on Admiralty wind and current charts for Pacific, Atlantic, and Indian oceans, 1872 (republished January 1879), showing the Isobars and Isotherms for the different seasons of the year.

Thermometer. — The thermometer in the northern hemisphere rises with east, south-east, and south winds; with a south-west wind it ceases to rise and begins to fall; it falls with west, north-west, and north winds; and with a north-east wind it ceases to fall and begins to rise. In the southern hemisphere it rises with east, north-east, and north winds; with a north-west wind it ceases to rise and begins to fall; it falls with west, south-west, and south winds; and with a south-east wind it ceases to rise and begins to fall.

CURRENTS.—The currents of the ocean are properly distinguished by the different and significant names of "stream" and "drift." The drift current is merely the effect of wind on the surface of the water, as for example, in the region of the trade winds, where the whole surface of the sea, generally speaking, is converted into a slow current moving to leeward. A drift current is therefore shallow and slow, and can run in no other direction than to leeward.

The stream current has been described as an accumulation of the parts of the drift into a collective mass, by the intervention of some obstacle. The mass then running off by means of its own gravity, and taking the direction imposed on it by the obstacle, becomes a stream of current, and in many cases a powerful stream, pursuing its way like a vast river through the ocean.

RENNEL CURRENT.—The easterly current from the North Atlantic ocean strikes the land near cape Ortegal, in Spain, and then appears to divide into two branches; the northern portion flows east along the north coast of Spain, then north along the west coast of France, where it is felt at 30 or 40 miles off shore, and is 15 or 20 miles across. It has been found to run at the rate of from half to two-thirds, and sometimes a mile an hour, the velocity varying according to the strength and direction of the wind, that from the westward causing a heavy swell and considerable augmentation in its strength. The current becomes wider as it proceeds northward; in the lat. of Brest it is 80 miles across, and its direction nearly N.W. It passes westward of Ushant at 15 or 20 miles from that island, crosses the entrance of the English Channel, and takes a westerly direction from the Scilly isles. At the entrance of the Irish sea it is divided into two branches, one of which is diverted into that sea, whilst the principal branch flows W.N.W. and West towards cape Clear.

Cape Finisterre to Cape Verde.—It may be taken for granted that the whole surface of that part of the Atlantic ocean between the parallels of 40° and 30° N., and from a distance of 100 miles from the shore to 500 miles west of it, is in motion towards the strait of Gibraltar and the African coast; this direction of current is experienced when 50 miles west of Madeira, westward of which position it sets to the south-westward.

From cape Finisterre the current generally flows to south-east and south along the coast of Portugal as far as cape St. Vincent, when it runs easterly toward the strait of Gibraltar.

From the strait of Gibraltar to the Canary islands the current within a hundred miles from the coast flows to the westward, following the bends of the shore; among the Canary islands it is irregular.

From the Canaries to the cape Verde islands it generally sets from S.S.W. to S.W., with a velocity of from 6 to 24 miles a day, being variable according to the direction, duration, and force of the wind.

Chronometric observations are therefore especially necessary, in order to correct a vessel's position for the effects of the currents, which prevail between the parallel of cape Finisterre and that of cape Verde islands.

GUINEA CURRENT.—The Guinea current is a stream current running to the eastward along that part of the African coast comprised chiefly between cape Roxo and the bight of Biafra, extending southward to the 3rd and 2nd parallels of North latitude. Its western limit can be traced at all seasons of the year as far as the 23rd meridian of West longitude, but in the summer and autumn months especially (July to November), an easterly current extending beyond this meridian to that of 53° W. is frequently experienced; this is probably an expansion of the Guinea current proper.

The greatest velocity of the Guinea current is stated to be off cape Palmas, where at a few miles from the shore it has been found to run three knots an hour. The space separating the Guinea and Equatorial currents is generally limited, thus presenting the remarkable feature of two well-defined streams running in exactly opposite directions side by side.

The Guinea current, at all seasons, may be considered a warmer stream than the Equatorial.

Cape Verde to Sierra Leone.—On this coast, extending 150 to 200 miles from the shore, the winds and currents change with the seasons. From June to September squally S.W. winds and a N.E. or northerly current are experienced. From October to May, when N.E. and northerly winds prevail, a south-easterly current is experienced.

Sierra Leone to Cape Palmas.—The current on this part of the coast is influenced by the wind. Between May and October it sets to the N.W. with winds south of S.W., and to the S.E. with winds west of S.W.; in November there is generally a current setting N.W.; from December to May a current setting S.E.

Bight of Benin.—In the harmattan season (December to February) the Guinea current near the land in the bight of Benin is checked, and in shore a westerly set is felt. Heavy tornadoes have a similar effect in checking the Guinea current. The surface temperature of the sea is generally about 80° F. at all seasons of the year.

EQUATORIAL CURRENT.—The equatorial current in its course between the continents of Africa and America, may be considered chiefly as a "drift" current, formed of water brought from a cooler region by the south-east trade wind. It may be said to commence in the neighbourhood of Anno Bom island, or immediately south of the equator, between the 2nd and 8th meridians of East longitude, although from this locality a continuity of the northerly drift along the coast of south Africa, as well as from the river Congo, may be traced. The surface temperature in its eastern part is several degrees colder for a great part of the year than the adjacent Guinea current, affording evidence of receiving waters from a remote and colder parallel.

The Equatorial current, appears to attain its greatest volume and velocity, during the season of the northern summer. From the African coast to about the 15th degree of West longitude the maximum strength has been observed in June and July; westward of that meridian, at successive later periods, or between July and October; being, however, mainly a "drift" current, it is probably subject to irregularities in strength, depending on the winds.

The northern boundary, or, rather, the definite line of separation between it and the Guinea current, has been well traced in the space extending from the meridian of Greenwich to 23° W.; and is found to vary little at the several seasons of the year; for example, in the 20th West meridian, the "line of separation" in October and November is in 5° N.; in March and April in 2½° N.; in the 5th degree of West longitude the "line of separation" appears to be generally constant in 2° N. Approaching the African coast, Anno Bom island is considered to be at all seasons in the Equatorial current, Princes island in the Guinea current, and St. Thomas, situated nearly midway between the two, as within the influence of one or the other current, according to the seasons.

From Anno Bom island to about the 15th meridian of West longitude, the following are the average surface temperatures of the Equatorial current:—

December	to March -	- 70° to 82° F.
March	,, July -	- 82 ,, 72
July	,, October	- 72 ,, 75
October	,, December -	- 75 ,, 78

Westward of the 15th meridian the surface temperatures at the several seasons lessen materially in their annual range, and the Equatorial current gradually loses its earlier features of being a cold water stream at one particular season of the year.

Congo stream.—The stream of this river is occasionally felt when 300 miles from its entrance, and the discoloration of the sea is clearly discernible at that distance. It runs with almost undeviating regularity to the N.W. and N.N.W., decreasing in strength as it extends seaward; its rate is about two miles an hour until absorbed in the Equatorial current.

Effects of refraction.—Navigators should constantly bear in mind that the extraordinary refraction produced by the heated atmosphere along the whole coast of western Africa is a continual source of error, not only in observations for latitude but also in chronometric longitudes; and one against which they can make no provision, as the altitudes of the sun are as often found to be too little as too great. Their only resource will be that of verifying the observations made in the day by altitudes taken at night of stars and planets. And not only is the seaman thus puzzled when making a landfall, or in recognising a headland by means of the latitude, but he is exposed by the same cause to another very serious deception; for this excessive and ever-varying refraction, sometimes amounting almost to a mirage, renders it difficult to make a correct estimate of the distance of the land. In this case he may indeed have recourse to the lead, as a bank of soundings of considerable breadth extends from most parts of western Africa; or, when any extent of coast is in sight, cross bearings will afford an immediate solution of his doubts; in certain situations, the change of bearing of an object on shore, at each extreme of a short distance measured by the log, will give a close approximation to its real distance. Still he should be on his guard against this species of fallacy, for at times the distant shore will appear alarmingly close to the vessel; and at others the really near land will appear removed to such a distance, as to impose upon the most practised and experienced eye.

AZORES OR WESTERN ISLANDS.

AZORES, or WESTERN ISLANDS,* belonging to the kingdom of Portugal, from the coast of which they are distant about 800 miles, are nine in number, and consist of three groups, with clear channels between them.

The Azores were discovered in the 15th century; with the exception of the south-easternmost (St. Mary), they are of volcanic origin, and may be considered as so many craters thrown up to heights varying from 35 feet to 7,613 feet, on an extensive ridge, 330 miles long, lying in a north-west and south-east direction, and comprised within the parallels of 36° 55′ and 39° 45′ North latitude, and the meridians of 24° 45′ and 31° 20′ West longitude.

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* *See* Admiralty chart.—Azores or Western isles, No. 1,950.

Being generally mountainous they may be seen from a considerable distance, the summit of Pico being visible from a distance of 75 miles.

The islands derive their name from the fact of their abounding with a species of falcon when first discovered. At that time they were generally thickly wooded, but now small plantations and orange gardens, with uncultivated patches of heath and scrub, cover much of the surface.

The vegetation is a mixture of that of Europe and the tropics, for instance, wheat and bananas, figs and cabbages, oranges and potatoes, are alike abundant and good of their kind.

The animals and birds are similar to those found in Great Britain; and the islands are free from poisonous animals or reptiles; the fishes are of a mixed British and West Indian character; the insects and plants are partly British, partly Spanish, and partly Portuguese.

The North-west group includes the islands of Corvo and Flores, separated from the centre group by a clear channel 120 miles wide..

The Centre group consists of Fayal, Pico, San Jorge, Graciosa, and Terceira islands.

The South-east group is composed of St. Michael (San Miguel) the largest of the islands, the north-west extreme of which is separated from the south-east extreme of Terceira, by a navigable passage 75 miles in width; and of Sta. Maria (St. Mary) island, 43 miles S.S.W. from St. Michael, with Formigas rocks lying north-eastward of it.

Population.—The number of inhabitants amounts to about 260,000. The seat of government is at Angra in Terceira, but Ponta Delagada in St. Michael island is the principal town.

Climate.—Though unsettled and humid the climate is on the whole excellent. The mean annual range of the thermometer is from 48° to 82° F. Rains are frequent.

Volcanic eruptions.—The archipelago, with the exception of St. Mary island, that lies slightly south of the general direction, is subject to the most tremendous convulsions. Towns and villages have been destroyed, and islands and rocks have been forced up from the waters, that, after occasioning several wrecks, have again disappeared.

Produce.—The average annual yield of oranges is about 200,000 boxes; wine 16,500 pipes; brandy 700 pipes; a quantity of coarse linen was formerly exported to Brazil; and the markets of Lisbon, Oporto, and Madeira are supplied with wheat, barley, and pulse of all sorts.

Tides.—The course of the tidal wave which strikes the Azores is from S.W. by S. to N.E. by N., the rise of tide varying about one foot for every 100 miles, throughout the group; that is to say, at Flores the spring rise is 3½ feet and at St. Mary it is 6 feet.

Winds.—The Azores are remarkable for the prevalence of strong winds, and throughout the year the number of calm days scarcely on an average amount to more than ten.

During summer the prevailing winds are those from N.E. and East, but these are not steady, unless they commence to blow well from the eastward and rise gradually.

No continuous fine weather should be expected except between the middle of June and the end of September, during which period long continued calms are often experienced.

During winter the prevailing winds are strong and blow from N.W., West, and S.W.

South and S.E. winds are accompanied by violent squalls, as also are those from N.W. S.W. winds generally bring rain.

S.W. gales usually veer to N.W., and then moderate.

Gales are also experienced with both N.E. and S.E. winds, the latter being generally accompanied by a clear sky.

In the vicinity of Corvo and Flores islands the weather is very changeable at all seasons of the year, and even in summer fresh N.W. and S.W. winds are often experienced.

The following is condensed from remarks by T. C. Hunt, Esq., H.M. Consul at St. Michael 1842, being the result of extended observations:—Gales generally enter these seas in the north-west quarter, and disappear to the south-east, veering through west and south; it seems, therefore, probable that if a vessel were caught in a violent gale in the current of the Gulf stream near the Azores, the best course to pursue would be to steer due north, or south, as the veering of the wind would allow; for if steered to the eastward, she would accompany the gale, and be overtaken by the centre, and by steering to the west she would sooner meet the centre; the northerly course appears preferable, from the fact that the storms near the Azores have almost always been found to deflect to the southward.

Fog.—Thick fogs often occur among the Azores during winter.

Barometer.—During the passage of the centre of a gale over the Azores the barometer usually falls to 28·50, and rises one tenth for every 10 miles of its removal; so that the distance from the centre of an approaching gale might be roughly estimated from the excess of the height of the barometer above 28·50.

Currents.—Near the Azores the currents are irregular, and generally weak, but sometimes attain a velocity of 20 miles per day, caused probably by the Gulf stream expending itself in their neighbourhood.

CORVO ISLAND,* the northern of the Azores, is separated from the north extreme of Flores island by a clear channel 9 miles wide.

The island consists of a single extinct volcanic mountain, and is about 9 miles in circuit, elongated in a north and south direction; the crater, 3¼ miles in circumference, occupies all the north-west portion of the island, and the highest part of the ridge is 2,548 feet high; at the bottom of the crater are two lagoons 1,277 feet above the sea.

Population.—The number of inhabitants in Corvo is about 1,000.

Pesqueiro point.—The south extreme of Corvo island is sharp and well defined, with some detached rocks extending 2 cables from it, and shoals of 3 and 4½ fathoms lying 3 cables south-east of it; on the south side of this point landing can be effected, and on the east side is situated the fishing village of Rosario, in a small bay. The west side of Corvo island is without indentations and extends in a general N.N.E. direction about 3 miles to Torrais point.

Oeste point, which presents the appearance of low earth cliffs descending in one or two terraces to the sea, lies midway between Pesqueiro point and Torrais point, and projects slightly from the line of coast; in the bight between Oeste point and Pesqueiro point is the conspicuous Sugar-loaf rock, and about three-quarters of a mile south west of Oeste point is situated a low rock known as Ilheo de Mulha.

Torrais point, the north extreme of Corvo, is remarkable, rising steeply from the sea to the edge of the crater; north of the point, distant 1½ cables, is a sunken rock, and when rounding it the water should not be shoaled to less than 25 fathoms.

Norte point, lying E. by S. from Torrais point distant 4 cables, is an inaccessible rock 368 feet high, which projects 150 yards at right angles to the line of coast; its northern part forms an overhanging cliff conspicuous when bearing East or West. Between North point and Torrais point there is a high black rock close to the shore and several low detached rocks.

Nordeste point.—The east side of Corvo island consists of almost inaccessible cliffs, with rocks scattered at their bases, forming a gentle curve; Nordeste point, a bold bluff 760 feet high, lies 1¾ miles eastward from Torrais point.

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* *See* Admiralty chart:—Corvo and Flores islands, No. 1,946.

Sunk rock, with 3 feet on it and foul ground between it and the shore, lies 3 cables N.E. by E. from Nordeste point.

Casa point, high and surmounted by a conical hill, is situated midway between Nordeste point, and Pesqueiro point. A rock above water lies a cable south-east from it, and another, also above water, lies 2 cables north-east of the point.

Soundings.—The bank on which Corvo island stands is generally steep; at the north extreme the 100 fathom line is 1½ miles distant from the shore; at Casa point, one mile. Off the south extreme, at one mile distant, the depth is 250 fathoms; along the north-west side the bank is shallow and rocky for half a mile from the coast, at which distance there are 15 fathoms, and the 100 fathom line lies 1½ miles from the shore.

Tides.—It is high water, full and change, at Corvo and Flores islands, at 0h. 20m.; springs rise 3½ feet. The stream of flood tide runs to N.E. by N. and the ebb S.W. by S., with a velocity of 1½ knots per hour at springs; these tidal streams, when opposed by gales, create a most confused sea off the north and south extremes of both islands.

Anchorage, on an emergency, may be found on the south-west side of Corvo islands, in 25 to 30 fathoms, one mile off shore between Oeste point and Sugar-loaf rock; also on the south-east side of the island in 23 to 35 fathoms, sand, three-quarters of a mile off shore between Casa point and the village of Rosario.

FLORES ISLAND,* the westernmost of the Azores, is 9 miles long in a north and south direction, and 6½ miles in width, it is generally mountainous; the summit, 3,087 feet high in the north-west part, slopes gradually to the northward, whilst to the southward the island is occupied by mountains about 2,000 feet high, down the sides of which numerous cascades fall into the sea. Flores is highly cultivated, and roses grow in great profusion.

Population.—The number of inhabitants in Flores island is about 10,500.

Delgada point, the north extreme, is of moderate height, and surmounted by a conical hill having a cluster of islets and rocks extending about 3 cables frem its base.

Ruiva (Red) head, the north-east extreme, 735 feet high, lies 2½ miles S.E. by S. from Delgada point; the rocky coast between, receding one mile, affords shelter in 20 to 25 fathoms, sandy bottom, from winds between S.E. by S. through south to W.N.W., and is frequently used by vessels requiring water; at the head of this bight is situated an islet 385 feet high, with foul ground lying east of it.

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* *See* Admiralty chart:—Corvo and Flores islands, No. 1,946.

Bottle rock, 100 feet high, is detached from Ruiva point, leaving a boat passage between.

Santa Cruz* the principal town in Flores island lies 3 miles S. ¾ E. from Ruiva head, the coast between being somewhat indented. Santa Cruz point, on the southern part of which stands the castle of Santa Cruz, and the town of that name, is low and rocky, with foul ground extending 2 cables from it.

Alvaro Rodriquez island lies close to the shore, one mile southward of Ruiva head, and south-east of it anchorage may be obtained in 36 fathoms, sandy bottom, sheltered from westerly and south-westerly winds.

Water may be obtained during westerly winds, from a stream situated 1¼ miles north-west of Santa Cruz.

Anchorage.—Cabeiro point, low and rocky, lies 1¾ miles south-west of Santa Cruz point, and between them is situated a bay half a mile deep, having a sandy beach and a stream at the head. This bay affords the best anchorage off the island, and from its proximity to Santa Cruz is much frequented; the usual berth is about three-quarters of a mile off shore in 35 or 40 fathoms, sheltered from S.W. winds and those from S.W. through west to N.N.E.†

Landing may be effected between the low rocks extending from Santa Cruz point, and inside a reef immediately south-west of Cabeiro point.

Supplies.—Bullocks, sheep, pigs, fowls, and potatoes can be obtained at moderate prices.

Lagens point.—From Cabeiro point the coast trends in a general south-westerly direction for a distance of 3½ miles to Lagens point, the south-east extreme of Flores island, from which rocks extend about 2 cables in a S.S.E. direction; at 1¼ miles south-west of Cabeiro point there is a high sloping point, with a church on it, and between them is a bay, with a beach and stream at the head; in this bay anchorage may be obtained in 26 fathoms, but not so good as that northward of Cabeiro point.

Lagens village, with its conspicuous church, is situated in a small bay close northward of Lagens point, where there is good landing. Anchorage may be obtained in 25 fathoms, sand, with winds from North through west to S.W. by W. The bay is much frequented by vessels, from the advantages it possesses for working out of it.

Escolar, or Sunk rock, with 4½ fathoms on it and deep water all around, lies 1⅝ miles W. by S. ½ S. from Lagens point. The coast north-east of Lagens point, kept open east of that point, leads eastward of it; and Ilheos point, the south-west extreme of Flores island, bearing N.W. by N. leads westward of it.

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* *See* plan:—Santa Cruz on Admiralty chart, No. 1,946; scale, $m=3$ inches.

† H.M. gunboat *Britomart* anchored in August 1873 with Cabeiro point bearing S. 55° W. and the east gable of Santa Cruz cathedral, bearing N. 25° E., in 22 fathoms coarse sand.

Coast.—From Lagens point the coast trends in a W.N.W. direction for a distance of 4 miles to Ilheos point, off which lie several detached islets, and near which are some hot mineral springs; from thence the coast turns to form the west side of the island, extending N.N.E., 7 miles to Fanaes point which is low; the coast between rises abruptly, and forms rocky points enclosing small sandy bays.

Ilheos point is low and rocky, Rocha alta point about a mile eastward of it is high, brown, and steep. Between these points a shoal of 3 fathoms extends 3 cables from the shore.

Anchorage may be obtained in 23 fathoms with Ilheos point bearing E.S.E. distant about three quarters of a mile.

Monchique islet, 110 feet high, lies one mile N.W. by W. from Fanaes point, and Baxio Raza islet, nearly joined to the shore, lies half a mile W. by N. from Fanaes point; between these islets the depth is 14 fathoms.

Baxio point lies 2¼ miles south-west of Fanaes point and between them is a bay affording anchorage with off shore winds, in 25 to 30 fathoms; a good supply of water may be obtained in this bay from a mountain stream, by means of a hose. With the wind between N.E. and S.S.E. a vessel might heave to and obtain water.

Landing.—The best landing place at the north-west part of Flores island is situated south-east of Baxio Raza islet.

Supplies.—By the aid of boats, water may be procured at the rate of half a ton per hour. Cattle, poultry, vegetables, and eggs may be readily obtained.

Albernas point, the north-west extreme of Flores island, lies 2 miles N.E. by E. from Fanaes point; it is steep, of a reddish colour, and 270 feet high; in the indentation between is situated Gadella islet, 520 feet high; several rocks lie close to Albernas point, and the rocky coast trends from it E. by S. for a distance of 1¼ miles to Delgada point before described.

Soundings.—The bank on which Flores island stands has somewhat the shape of the island; on the meridian of Delgada point the water deepens gradually from the shore, and the 100 fathom line is 4½ miles distant; at Santa Cruz it approaches to a mile, and maintains that distance to abreast of Lagens point; eastward of Ilheos point shoal water extends 3 cables off shore; south-west of Ilheos point the 100 fathom line is 3 miles from the shore.

Laranjeira shoal, on which the least water obtained was 11 fathoms, lies S.W. ½ S. distant 1½ miles from Ilheos point; there is a depth of 20 fathoms between this shoal and the shore.

On the west side of the island the 100-fathom line is generally 2¼ miles from the shore, and the edge of the bank very steep, the depth of 200 fathoms being found at a distance of 2½ miles from the coast.

It may be said generally that the bottom within a distance of one mile from the island is rocky; at about one mile distant there are belts of sand, and further off the bottom is rocky.

FAYAL ISLAND,* the westernmost of the centre group of the Azores, is separated from the north-west extreme of Pico island by Fayal channel. The island is 11 miles long, in a N.W. and S.E. direction, and 7 miles across near its centre; several small volcanic mountains are situated on the north-west part, but the principal portion of the island is occupied by Pico Gorda, that rises near its centre to an elevation of 3,351 feet, the crater being on its north side. Fayal is noted for its mild climate and excellent pastures.

Population.—The inhabitants of Fayal number 26,260; the principal town is that of Horta on its south-east side, and there are besides this several villages situated in various parts of the island.

Fayal channel † is 2¾ miles wide, between Espalamaca point on the western side and Magdalena rocks, which extend half a mile from the north-west extreme of Pico island, and should not be approached to less than 20 fathoms; in Fayal channel the depth is generally less than 100 fathoms.

Chapman rock, about 50 yards in extent, N.E. and S.W., on which the least water is 4 fathoms, with from 20 to 50 fathoms at a cable distant all round, lies nearly in the middle of the southern part of Fayal channel, bearing S.E. ¼ E. distant 1½ miles from Guia head, the south-east extreme of Fayal island.

Clearing marks.—Espalamaca point (a perpendicular cliff 420 feet high, the north-east extreme of Horta bay), in line with Joao Dias point, situated 1½ miles north of it, and bearing N.N.E. ¼ E., leads 5 cables westward of Chapman rock; and the south extreme of Guia head, in line with the south-west extreme of Fayal island, bearing N.W. by W. leads 4 cables northward of it.

When the summit of Monte (a hill in Pico island, 437 feet high, close east of Pé do Monte point) bears S.E. by E. ½ E. a vessel will be south of Chapman rock.

Guia head, the south-eastern extremity of Fayal island, is a peninsula 487 feet high, 1½ miles in circuit, with a chapel and signal station on its summit; it is connected by a low neck to a small black mount (Monte Queimada) on the north-west side of which the town of Horta commences.

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* *See* Admiralty chart:—Fayal, Pico, and San Jorge islands, No. 1,855.

† *See* plan:—Fayal channel, on Admiralty chart, No. 1,940; scale, *m* = 2·5 inches.

Pim bay, on the west side of Guia head, is used in fine weather by small vessels, but it is quite open to the south-west. Porto Pim at the head of this bay has in it a depth of one to 2¾ fathoms.

Caldeira Inferno, on the south side of Guia head, is an inlet 2¼ cables long, in a north and south direction, narrowing midway to half a cable broad, with a depth of 2 fathoms, and then expanding into a basin 1¼ cables wide, with from 2 to 4 fathoms in it.

Coast.—West of Guia head for a distance of 4 miles, the coast is low and rocky.

Castello Branco, the south-west extreme of Fayal island, is a round conspicuous peninsula, situated 6 miles N.W. by W. from Guia head; midway is situated the cove of Feiteiras, with several islets westward of it. East of Castello Branco point, distant 1½ miles, in front of a village, boats may effect a landing.

Comprida point, the north-west extreme of Fayal island, lies 5½ miles N. by W. ½ W. from Castello Branco point; in the bight midway landing may be effected, as also in the little bight immediately east of the point. Negra point is the name by which the northern extreme of Comprida point is known.

Capellinha rock, above water, is the outer of several dangers lying off Comprida point; between the rock and the point there is a narrow passage available for boats in fine weather.

Cedros point, the north-east extremity of Fayal island, is high and bold, situated 6 miles eastward of Negra point; the intermediate coast is cliffy, forming a bight, one mile deep, named Praya da Norte bay, at the head of which there is a sandy beach, with a village on its western side.

Ribeirinha point.—From Cedros point the coast trends S.E. by S for a distance of 6 miles; the shore is cliffy and terminates in a sharp point named Ribeirinha, the east extreme of Fayal island; midway, at Salaõ point, landing may be effected. From Ribeirinha point the coast trends S.S.W. ¾ W. for a distance of 2¾ miles to Espalamaca point, the northern limit of Horta bay; Joa Diasõ point lies midway.

In the bay northward of Espalamaca point, known as Praya bay, small coasting vessels find shelter in southerly winds.

Horta bay,* situated at the south-east extremity of Fayal island, is three-quarters of a mile deep; Espalamaca point, its north entrance point, bears from Guia head, its south limit, N.E. ½ E. distant 2 miles; the depth midway on that line is from 16 to 22 fathoms; the 10-fathom line is generally 2½ cables from the shore.

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* *See* plan:—Horta and Pim bays, on Admiralty chart, No. 1,940; scale, *m* = 6·0 inches.

At a quarter of a mile west of Espalamaca point is situated a signal station, on a hill 420 feet high, from which the cliffs on the northern side of the bay decline to the low black sandy beach, which from Fort de Lagoa extends round the head of the bay to the mole and landing place at the southern part of the town; from this mole the coast rises to Monte Queimada, from the north-east base of which rocks and shoals extend 2 cables. The coast on the east side of Monte Queimada is formed of high steep bluffs fringed by rocks and shoals, extending one cable from the shore.

The most conspicuous objects in the town of Horta are the convent of San Francisco having two towers, the Jesuit college near the beach about the middle of the town, and the Carmelite convent on high ground at the western part of the town.

The population of Horta numbers 7,630.

Breakwater.—A breakwater, extending in an easterly and northerly direction from Queimada point on the south-west side of Horta bay, is in course of construction.

Anchorage.—This is one of the best anchorages among the Azores, although open to winds from N.E. to E. by S., and from S.S.E. to S.W.; the latter occasionally blow hard, but the holding ground (fine black lava sand) is good, and a well found vessel might ride securely, though it is generally advisable to weigh, and run to leeward of the island until the wind abates. A sailing vessel, to be in a good position from which to weigh, should anchor in 25 fathoms, sand, with Ribeirinha point just shut in by Espalamaca point bearing N.N.E. ¾ E., and the north extreme of the Jesuit college in line with the south extreme of the Carmelite convent bearing N.W. (the Carmelite convent is high and conspicuous); this is the usual anchorage for vessels of war; steam vessels may approach nearer the town, but should not anchor in less that 14 fathoms. With S.W. winds a heavy sea sets in to the bay.

Directions.—No difficulty presents itself in standing in to Horta bay. Guia head is steep-to, but Espalamaca point should not be approached within 2 cables, as the ground is irregular off it, and at 1½ cables south-east of that point is situated a rock with 12 feet of water on it.

Weather.—When the summit of Pico is enveloped in clouds, stormy weather and rain generally follow. Great clearness of atmosphere generally precedes a southerly gale.

Tides.—It is high water, full and change, at Fayal island at 11h. 45m.; springs rise 4 feet. In Fayal channel the flood stream sets N.E., and the ebb S.W., with a velocity of from one to two knots an hour.

Landing.—The landing-place at Horta bay is very good, being built of stone, but occasionally it is difficult, and sometimes impossible on account of the sea, to effect a landing.

Quarantine.—Vessels calling at Fayal must be prepared to find quarantine regulations strictly enforced.

Supplies of all kinds can be procured, but, if ordered in large quantities, time must be allowed. Coal is supplied by the Government contractor, and sent off in lighters containing about 15 tons. The prices of stores and provisions are moderate. Extensive repairs to vessels can be effected at Fayal.

PICO ISLAND,* the loftiest of the Azores, derives its name from the volcanic mountain near its south-west part, 7,613 feet high, the remarkable peak of which terminates in a sharp cone shaped like a sugarloaf, visible in clear weather for a distance of 75 miles; it is frequently, however, obscured by clouds for five or six days consecutively. From the peak, smoke, flames, and ashes have been emitted to some distance.

The island, of an irregular oval shape, is surrounded by steep coast, without harbours, and is 25 miles long, in a N.W. and S.E. direction, and 8½ miles across in its widest part, which is about 7 miles from the northwest extremity and near the base of the peak. Pico Topo, 5,357 feet high, is situated 9 miles from the south-east extreme, and several peaks of 2,000 feet rise over the south-east portion of Pico island.

Population.—The number of inhabitants in Pico island is about 24,000.

Ponta da Ilha, the south-east extremity of the island, is low and sloping, with foul ground extending one cable eastward from it. The next projection to the westward is Calheta point, 2½ miles distant, and off which are two small islets ; between these points are two small bays where landing may be effected.

Arrife point, on which stands a cone 1,461 feet high, is the south-west extreme of Pico island, and lies 7¼ miles W. by N. ½ N. from Calheta point; the coast between is rocky, and should be avoided, but in the bight, landing may be effected by those having local knowledge.

Santa Catarina point, low and rounded, is situated N.W. by N. distant 3¾ miles from Arrife point; in the bay between is situated the lagoon of Lagens, that has boat communication with the sea at high water, and near which is built the town of the same name. Above Santa Catarina is situated the crater of the eruption of 1720.

West coast.—The west coast of Pico island, that forms the eastern shore of Fayal channel, is cliffy and fringed with rocks and islets from Sta Catarina point to Baixio Grande point, the north extreme, a distance of 17 miles. Three miles west of Sta Catarina point is situated S. João point, surmounted by two craters, and at 4 miles further westward lies the round point of S. Mattheus on which are five small hillocks.

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* *See* Admiralty chart :—Fayal, Pico, and San Jorge islands, No. 1,855.

The village of Candelaria, situated 2¼ miles south of Pé do Monte point (the southern limit of Fayal channel), is easily recognised by two towers standing close together.

Rollers extend about a mile off the north extreme of Pico island during a gale.

Magdalena rocks, the eastern and smaller 237 feet high, lie half a mile north-west of the most prominent portion of the north-west extreme of Pico island. The bottom between them and the island is foul, and from the westward they should not be approached to less than 20 fathoms.

Magdalena town, whence the greater part of the produce of Pico is conveyed to Fayal in boats, is situated at the north-west extreme of the island, abreast the rocks of the same name.

North-east coast.—From Baixio Grande point to the south-east extreme of the island the coast is very rugged, and there are only four places where landing may be effected, viz., at Porto Caxorro, 4 miles east of Magdalena; on the north side of San Antonio point, 9¼ miles east of that town; at Caes do Pico, three-quarters of a mile south-east of San Antonio point; and at the village of San Roque, one mile south-eastward of the latter place. A reef, 2½ cables long N.E. and S.W., and half a mile off shore, lies 1½ miles south-east of Misterio point, and 1¼ miles further eastward is situated the large village of Prainha.

Most of the projecting points on this coast are low and fronted by rocks, rising rapidly to the interior; Misterio point, which lies about midway between the north-west and the south-east extremes of the island, being the most prominent; the eastern portion of this coast is rather higher and more cliffy than the western.

Soundings.—The bank on which the islands of Pico and Fayal stands is 45 miles long, north-west and south-east within the depth of 100 fathoms; off the south-east extreme of Pico, the depth of 200 fathoms is found at a distance of 5 miles from the shore, whilst the north-east and south-west coasts of the island are generally less than a mile from the edge of the 200 fathom line. At Misterio point, on the north-east side of Pico, this line is only half a mile off shore: but at Arrife point, on the south side, it is 1¾ miles from the coast. Off the north-west extreme of Fayal the 200 fathom line is 2 miles from the shore, and maintains an even distance of about a mile from the coast on the north-east and west sides.

SAN JORGE ISLAND[*] lies north-east of Pico, separated from it by a deep channel 9½ miles wide.

The island is long and narrow, extending in a N.W. ½ N. and S.E. ½ S.

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[*] *See* Admiralty chart:—Fayal Pico, and San Jorge islands, No. 1,855.

direction, for a distance of 29 miles, with an average breadth of 2½ miles, the north-west extreme being sharp and pointed. It is occupied by a series of volcanic mountains, the highest, near the centre, being 3,498 feet high.

Supplies.—Cattle thrive well on San Jorge island, and good cheese is produced ; wood and water are abundant.

Topo point, the south-east extreme of San Jorge island, lies E. ½ N. distant 15 miles from the south-east extremity of Pico ; it is moderately high, and rendered conspicuous by the islet off it, and the village situated south-west of it.

Topo islet about half a mile in circuit, and 60 feet high, lies 2 cables eastward of Topo point; a few rocks lie around it, and the passage between it and San Jorge is blocked with rocks.

South-west coast.—Pontinha point lies half a mile south-west of Topo point, and between it and Monteiro point (3 miles to the westward) the coast is cliffy.

Manadas point, low and shelving, with a reef extending 2 cables from it, is the next projection, lying N.W. ½ N. from Monteiro point, distant 10 miles ; the intermediate coast is cliffy, with stones and rocks at the water's edge.

Queimada point, that is rather low, with a small fort on it, lies N.W. ½ N. from Manadas point, distant 8¾ miles, the coast between being low and rocky.

Morro Grande, high and of a blackish colour, with a look-out station on its summit, lies 1½ miles north-west of Queimada point ; between these points the coast forms a bay sheltered from off-shore winds, at the head of which is situated the town of Vellas, the capital of the island.

Vellas bay affords shelter from winds between W.N.W. through north to S.E., the head of the bay is formed by tolerably high cliffs forming several points. The town is situated at the northern part of the bay, and
-eastern part a small mole has been constructed, affording
rocky bottom, to small coasting vessels.

sual anchorage is outside, in 9 fathoms sand,
Grande and Queimada point, with the mole

s of a mile north of Morro Grande,
a hill known as Morro do Lemo,
been mistaken for Vellas bay
h-west of Morro Grande,
oint named Rosales point,

Rosales rock, 234 feet high, lies 3 cables north-west of Rosales point, and is surrounded by rocks above and below water; it is connected with the shore, and the group includes Rosalina rock, 232 feet high, lying 3 cables S.S.W. from the point.

North-east coast.—From Rosales point the coast composed of barren rugged cliffs, extends 13 miles in a south-easterly direction to Norte Grande point from which a reef extends 2½ cables, whence to Topo point it is lower and more regular, with a few indentations.

With the exception of the reef off Norte Grande point, the rocks which in some places fringe this coast are close to the shore.

Landing places.—On the south side of San Jorge island landing may be effected close westward of Pontinha point; inside a reef, 2 miles north-west of Monteiro point; in the bight 7½ miles north-west of Monteiro point; in a creek named Calheta, three-quarters of a mile eastward of Manadas point; under Castellitos point, 5 miles north-west of Manadas point; and at Villa das Vellas. On the north side the only landing-place is close eastward of Norte Grande point.

Soundings.—Off the north-west and south-east extremities of San Jorge island, the 200-fathom line is 5 miles distant from the coast; on the north-east side it is generally about 1½ miles from the shore; on the south-west side, off Monteiro point, it is 3 miles; at Manadas point half a mile, and that latter distance is maintained, until within one mile of the north-west extremity of the island.

GRACIOSA ISLAND,[*] the most fertile of the Azores, with 8,000 inhabitants, is the northernmost of the central group, and is separated from San Jorge island by a clear channel 20 miles wide.

The island is 7 miles long, in a N.W. and S.E. direction, with an average breadth of 3 miles; the highest mountain 1,349 feet high, stands over the south-east extreme; there are two others, having deep valleys between them, that when seen from a distance present the appearance of two or three islands, particularly when seen from the south-westward.

Produce.—Barley is grown in large quantities, also wheat, maize, grapes, all kinds or fruit, and vegetables. Sheep, pigs, and fowls are raised in great numbers; the only scarce article is wood, and that is principally obtained from San Jorge and Pico islands.

Carapacho point,[†] the south-east extremity of Graciosa island is low near the coast, but high and rugged a short distance inland; south-west of the point are situated several islets, and sunken rocks extend 4 cables in a S.S.W. direction; from the outer shoal of 7 feet, the north extreme of Baxo rock bears E. ½ S. distant 4½ cables; this rock lies in a direct line between Sul point and the south extreme of Baxo rock, about midway between them.

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[*] *See* Admiralty chart:—Terceira and Graciosa islands, No. 1,818.

[†] *See* plan:—Caldeira of Graciosa, on Admiralty chart, No. 1,818; scale, *m* = 2 inches.

Baxo rock, 450 yards long, with a high conical summit at its north-west extremity, has foul ground around; it lies 3 cables S.S.E. from Carapacho point, and there are 10 fathoms between it and that point.

Praya bay.*—From the south-east extreme of Graciosa island to Fanais point, the south-east extreme of Praya bay, a distance of 1½ miles, the coast is clear; from Fanais point, the north entrance point of Praya bay bears N. ½ W., distant 1⅓ miles, the coast between receding 2 cables; the north point of the bay (Negra point) is low and rocky; to the southward of it stands the town of Praya.

Praya island, three-quarters of a mile in circuit, and wedge shaped with the summit over the north-east point, lies half a mile E. by S. ½ S. from the north entrance point of Praya bay; several rocks lie around it, and E.S.E. from the south extreme, distant 2½ cables, there is a shoal of 4 feet, with 12 fathoms between it and the island a detached shoal with 6 feet on it, lies North distant 1½ cables from the north-east extremity.

Anchorage.—The usual anchorage off Praya is about 3½ cables southward of the island, in 13 fathoms.

Ferreira point, the east entrance point of Santa Cruz bay, lies 2½ miles north of Praya bay, the coast between consisting of small bights; the point is low, and foul ground extends north-east from it for a distance of 1¼ cables.

Santa Cruz, the principal town of Graciosa island is situated in a bight close westward of Ferreira point, and is rendered conspicuous by three small hills lying immediately south-west of the town, on the summit of each of which is situated a church.

Anchorage.—Vessels will find the best anchorage Graciosa affords to the eastward of Santa Cruz, in 35 to 40 fathoms sand, off the southern extreme of a slope extending to Ferreira point, with Baxo rock showing between Praya island and the shore of Graciosa, and Santa Cruz point bearing N.W. ½ N. To this anchorage all goods from the town of Santa Cruz are brought for shipment.

Tides.—It is high water, full and change, in Santa Cruz bay, at 0h. 15m.; springs rise 3½ feet.

Coast.—From Santa Cruz the coast, fringed with rocks, trends north-west for a distance of 2½ miles, and forms the north extreme of the island (Pico Negro point), which is high and very black, whence to the south-west it continues high and rocky for a distance of 2 miles to Fozo do Porto, the north-west extreme of the island, a double point with a small bight between; it then trends to the southward. At half a mile south of Fozo do Porto point lies Gomez point, low and rocky, situated at the base of a conical hill known as Monte Vermelho. Gomez bay,* between Fozo do Porto and Gomez points, is surrounded by cliffs and affords tolerable landing at its southern part.

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* *See* plan:—Praya de Graciosa, on Admiralty chart, No. 1,818; scale, $m = 2$ inches.

Branca point, the south-west extremity of Graciosa island, a short distance within which stands one of the highest mountains of the island, lies 2¾ miles S. ½ E. from Gomez point. From Branca point the coast trends south-east for 3½ miles to Sul point, which is high and bluff. At 1¾ miles south-east of Branca point lies Fogo point, low and rocky; in the bight between is situated Fogo village, and Forte island lies close to the shore, half a mile northward of Fogo point. Carapacho point, previously described, lies one mile east of Sul point; in the bights between the points there are several mineral springs.

Soundings,—Graciosa island stands on a bank 15 miles long within the 200-fathom line, and 9 miles wide. Off Baxo rock the 100-fathom line is 1¼ miles distant from the coast; off Praya island, one mile; off Santa Cruz, 2 miles; north of Pico Negro point it is 3 miles distant; north-west of Fozo do Porto it is 2¼ miles; south-westward of Branca point it is 3½ miles; whilst on the meridian of Fogo point it is only half a mile from the shore. Generally speaking, the depth of 200 fathoms will be obtained at a distance of half a mile beyond that of 100 fathoms.

Landing may be effected in the north part of Praya bay; at Santa Cruz; in Gomez bay, northward of Gomez point; and in Fogo bay, near Forte islands.

TERCEIRA ISLAND,† the easternmost of the centre group of the Azores, is 16 miles long N.W. and S.E., and about 8 miles in breadth; it is situated 20 miles east of the south-east extremity of San Jorge island, with a clear channel between; the coast is high, and surrounded with rocks, the only accessible places being fortified. The interior of the island is generally mountainous; in the south-east portion of Terceira island there is a high and almost circular plateau about 4 miles in diameter surrounded by high mountains, which are steep to the southward but slope gradually to the northward. The highest summit in the island (Caldeira de Sta. Barbara) occupies the western extreme, and attains the elevation of 3,500 feet: good roads lead to all parts of the island.

In consequence of its central position and the safety of the anchorage at Angra, it was made the seat of government.

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* *See* plan:—Gomez bay on Admiralty chart, No. 1,818; scale, $m = 2$ inches.

† *See* Admiralty chart:—Terceira and Graciosa islands, No. 1,818.

Produce. — The island is fertile, healthy, and pleasant. Large quantities of grain, potatoes, lemons, oranges and other fruits are grown.

Good pasturage for cattle is also afforded.

Population.—Terceira contains about 50,000 inhabitants, who are in a higher state of civilization than those of the other islands; the police regulations are also better enforced.

Malmerendo point, the eastern extreme of Terceira island, is high, and forms the north point for Praya bay; close to it lies a rock that uncovers at low water

Praya bay,[*] at the east extreme of Terceira island, is 2 miles wide and three-quarters of a mile deep; Baxios point, the south entrance point of the bay, bears from Malmerendo point S.S.W. ¼ W.; on that line the depth is from 8 to 15 fathoms, shoaling gradually to the beach; the south-west corner of the bay dries nearly 3 cables from the shore, and consequently does not afford such good landing as the north-west corner, where the town stands.

Praya is a fine and regularly laid out town, protected by a sea wall; a few black rocks lie close to the beach. Three small streams fall into Praya bay, the southern near the village of Cabo da Praya, situated at the southern part of the bay.

Anchorage.—The best anchorage in Praya bay is in 19 to 21 fathoms, sand, one mile off shore, with Malmerendo point in line with the west extreme of Carneiros islet bearing North, and two towers at the bottom of the bay in line. The comparatively shoal water of Praya bay admits of several vessels lying at anchor at the same time, sheltered from winds between S.W. and North, but entirely exposed to those from the eastward.

Contiendas point, the south extreme of Terceira island, surmounted by three peaks about 500 feet high, lies 3¾ miles S.W. by W. from S. Jorge point; in the bight between landing can be effected under Pico da Cruz, which is 715 feet high; a bank on which the least depth ascertained is 28 fathoms, with from 70 to 100 fathoms close to, and 50 fathoms between it and the shore, lies S.S.W. ½ W. distant 1¾ miles from Contiendas point; from the bank Frayles rocks bear W. by N. ¾ N. distant 1⅔ miles.

Landing may be effected in a cove three-quarters of a mile westward of Contiendas point, and in the bay 1¾ miles north-east of it.

Frayles rocks, lying S.E. distant 5¾ miles from the south extreme of mount Brazil, and W.S.W. distant 2½ miles from Contiendas point, are two in number, 30 feet high, with shoal water close to them, but at a distance of 3 cables all round, there are from 50 to 70 fathoms.

Cabras (Goat) islands[†] lie W. by N., distant 3 miles from

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[*] *See* plan:—Praya bay, on Admiralty chart, No. 1,818; scale, *m* = 2 inches.

[†] *See* plan:—Cabras islands, on Admiralty chart, No. 1,818; scale *m* = 2 inches.

Contiendas point and S.E. by E. ½ E. 3¼ miles from the south extreme of mount Brazil, or nearly midway between Contiendas point and Angra bay, and two-thirds of a mile S.W. by S. from the nearest shore, with 14 fathoms between them and Terceira island.

The islands are about a mile in circuit; the eastern is the larger, 480 feet high, and appears wedge-shaped when seen on an east or west bearing; the passage between them is 100 yards wide, with 7 to 10 fathoms water, and is used by boats.

Mount Brazil, forming the western shore of Angra bay, for which it is an excellent mark, is situated near the middle of the south coast of Terceira island; it is a remarkable peninsula 2 miles in circuit, 555 feet high, with a look-out station on its summit.

Angra.—At the base of mount Brazil on its north side, is situated the fort of St. Juan, the chief defence of Terceira island and of the city of Angra, the capital, built to the northward and eastward of it, and containing the residence of the Captain-General of the Azores.

From the fort, defences extend to fort San Antonio, on the east side of mount Brazil; on the north-east side of the bay stands fort San Sebastian.

Angra bay.*—Val point, the east extreme of Angra bay, bears from the south-east point of mount Brazil, East distant $1\frac{1}{10}$ miles; the bay extends North 7 cables, contracting midway abreast fort San Sebastian to 3½ cables in width, where the depth is 7 to 9 fathoms sand, with 4 fathoms at 1½ cables from the head; this inner bay is the usual anchorage for small vessels; large vessels should anchor in 30 fathoms, with the bay open, and the south-west extreme of mount Brazil bearing N.W. by W. ½ W., distant one mile; in this position, however, the holding ground is not very good. Angra bay is open to winds between S.S.W. through south to E.S.E., and with S.W. winds a heavy swell sets round mount Brazil.

From June to September, when the prevailing winds are those between west and north-west, vessels may lie in safety; but at other seasons of the year a constant watch should be kept, and an offing sought on any indications of approaching bad weather.

Signals.—When the state of wind and sea is such that it would not be prudent to anchor in Angra bay, a large red and white pendant is hoisted at the Custom house and also at San Antonio point, to warn approaching vessels to remain outside until the weather moderates.

Tides.—It is high water, full and change, in Angra bay at 0h. 32m.; springs rise 4 feet.

Serreta point.—From mount Brazil the coast curves north-westward for a distance of 11 miles, and then forms a rocky projection named

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* *See* plan:—Angra de Terceira, on Admiralty chart, No. 1,818; scale, *m* = 2 inches.

Serreta point, the north-west extreme of Terceira island; on this portion of the coast there is only one landing place, situated 6 miles north-west of mount Brazil, close westward of a mountain stream.

Serreta rocks lie 2 miles off the north-west extreme of Terceira island, with Serreta point in line with the Caldeira de Sta Barbara, bearing S.E. by S. They consist of two shoals of 4¾ fathoms, extending three-quarters of a mile north and south, and half a mile in width; at half a mile northward of the rocks, there is a depth of 35 fathoms, quickly deepening to 100 fathoms; and between the rocks and the shore 80 fathoms is the deepest water.

North coast.—From Serreta point the coast trends eastward for 6 miles to Rua Longa point, that has a rock close north of it and affords landing in a cove to the westward. The Pico de Pinto, 502 feet high, and situated 1¾ miles west of Rua Longa point, is a conspicuous object on this coast; it is the half of a conical hill, the outer portion of which has been carried away by the sea. From Rua Longa point the coast trends S.E. by E. 7 miles to Espartal point, being composed of cliffy bights, in one of which, situated 2 miles west of Espartal point, and with rocks off its entrance points, landing may be effected in front of the town of Villa Nova.

From Espartal point the coast is straight for 2¼ miles in a S.S.E. direction to Carneiros point, whence it turns south to Malmerendo point, forming a bight 1¾ miles across.

Villa Novo rock lies one-third of a mile off shore, bearing N.W. ¼ W. one mile distant from Espartal point, with 7 fathoms between the rock and the shore, and 14 fathoms at 3 cables from it in a north-east direction.

Carneiros islet, 62 feet high and steep to, is situated 1½ miles S.E. ½ E. from Espartal point; it lies half a mile off shore, with 17 fathoms between.

Volcanic eruption.—On the bearing of N.N.W. ¼ W. and 9½ miles distant from Serreta point is the site of an eruption that occurred in June 1867; nothing now remains to mark the position.

Soundings.—In an easterly direction from Malmerendo point the 100-fathom line of the bank of soundings on which Terceira island is situated, is found at a distance of 2¼ miles, and falls very steepy; south-east of the island, the 100-fathom line is 5 miles from the shore, the soundings gradually deepening to a depth of 200 fathoms at 9 miles. On the meridian of Frayles rocks, at one mile from them, there is a depth of 100 fathoms, and at 2 miles distance, 200 fathoms, but immediately west of these rocks the 200-fathom line is found at a distance of 5½ miles south of Cabras islands; from this position the edge of the bank takes a

N.N.W. direction. On the meridian of mount Brazil, the 100-fathom line is one mile off shore, and the edge of the bank steep-to ; on the south-west side of the island it is only half a mile from the shore ; this distance is maintained till off the north-west extreme, where the 100-fathom line of the bank on which Serreta rocks stand, is 4 miles from the shore, and the 200-fathom line 5½ miles ; at 3 miles eastward of Serreta point, the 100-fathom edge of the bank, which is very steep, is one mile from the shore ; in a northerly direction from Rua Longa point the 100-fathom line is 1½ miles distant, and the soundings gradually deepen to 200 fathoms at 6 miles, whence to the east extreme of the island the 100-fathom line is about a mile off shore, and the bank steep.

SAN MIGUEL (St. MICHAEL)* is the northern island of the eastern group of the Azores.

The north-west extreme of San Miguel island bears from the south-east extreme of Terceira island S.S.E. ⅓ E., distant 75 miles; in the channel that separates them, many rocks have been reported on various occasions, but it was specially and thoroughly examined by Captain Vidal, in H.M.S. *Styx*, during the Admiralty survey in 1843–4, when no indications of rocks were found, and the soundings varied from 195 to 350 fathoms.

This island is the largest and most important of the Azores, being 35 miles long in a W.N.W. and E.S.E. direction, and from 4 to 8½ miles in breadth, the narrowest part being from the bay east of Delgada point on the south, to the head of a large bight on the north side ; it contains a number of mountains, hills, and valleys, of volcanic origin ; the eastern extreme of the island is the highest, being occupied by mountains more than 2,000 feet high, the most elevated, Pico da Vara, 4 miles from the extreme east point, being 3,570 feet above the sea. In the centre of the island are three peaks, Serra Gorda, the western and highest, at 3¼ miles N.N.E. from Delgada point, being 1,570 feet high ; the western portion of the island is higher, the loftiest summit, Pico da Cruz, 5 miles from the north-west extreme of the island, being 2,777 feet high ; northward of it, at the bottom of an immense crater, is situated Lagoa grande, an extensive lake, 866 feet above the sea, in which the depth is 14 fathoms. Generally, the land on the north side of the island slopes gradually to the sea, but on the east, south, and west sides it is more irregular and precipitous.

Climate.—Although the climate is variable in heat and humidity, it is of the most temperate description, and the changes do not materially affect health, personal comfort, or the operations of out-door business. As in summer it is seldom that clouds do not float in the atmosphere, mitigating the heat of the sun, so in winter there are few days when this is not felt :

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* *See* Admiralty chart :—San Miguel island, No. 1,854.

and during the year there is generally not one day of necessary total suspension of agricultural labour.

For invalids St. Michael is considered by those who have tried both places to be preferable to Madeira, as in addition to the mildness of the climate it has both hot and cold mineral springs, which are highly spoken of as a cure for rheumatism and similar diseases, as well as affording considerable relief to consumptive patients.

The mean winter temperature is 59° F.; the ranges being from 46° to 72° F. in February, and 64° to 84° F. in August.

General appearance.—When approaching the north-west extreme of the island from the westward it has a very unpromising appearance, the mountains being barren and the coast formed of basaltic pillars, with a few stunted trees over them; the coast when seen from the southward is more pleasing, consisting of open pastures, vineyards, and cornfields, interspersed with orange trees, &c.

When seen from a distance, owing to the lower land being frequently covered with haze, San Miguel occasionally presents the appearance of being two islands.

Population.—The population of St. Michael island is 105,400.

Trade.—The imports in 1875 from Great Britain amounted to 65,048*l.*, and the value of the export of oranges in the same year amounted to 81,094*l.*

The total number of British vessels entered at St. Michael island in 1875 was 88 with an aggregate tonnage of 27,274; of these 29 were steam vessels, and 59 sailing vessels.

Tides.—It is high water, full and change, at St. Michael island (Ponta Delgada) at 0h. 30m.; springs rise 6 feet.

Produce.—The soil of St. Michael is extremely fertile, and produces wheat, maize, broad-beans, haricots, a species of sweet potatoes, also fruit and vegetables in great quantities. Oxen, sheep, pigs, and poultry thrive well. Wine is produced for home consumption. Flax is largely cultivated, and forms an important article of commerce; water and wood are abundant. The town of Ponta Delgada offers most of these resources.

Ferraria point, a low dark rugged point, the north-west extreme of the island, is situated at the base of the peak of Camarinhas, the last active volcano of San Miguel; this peak is 687 feet high, and lies one third of a mile from the coast; from Ferraria point, rocks extend a short distance to seaward.

Sabrina shoal is the site of a volcanic island that, in June 1811, was seen from H.M.S. *Sabrina* to rise from the sea, in an active state of eruption, to the height of 300 feet; after remaining above water for four months, it gradually disappeared; on the shoalest part, near which

H.M.S. *Styx* anchored in June 1841, there is a depth of 15 fathoms. From it Ferraria point, distant one mile, appears in line with the coast south of it, bearing South; and Mosterios point bears E. ¾ N.

Candelaria point, a high inaccessible cliff fronted by a narrow stony beach, lies 2¼ miles south of Ferraria point, the intervening coast being cliffy. From Candelaria point the coast trends S.S.E. for 9½ miles in a continuous line of cliffs, terminating at Delgada point, that forms the western limit of a bay 9 miles wide and 1½ miles deep, in the western corner of which the city of Ponta Delgada is built.

Ponta Delgada,* the principal city of St. Michael island and commercial capital of the Azores, is situated close eastward of Delgada point; it is well built on a small plain, and contains about 20,000 inhabitants. The fort of San Bras, west of the town, is the principal defence.

LIGHTS.—From the Custom-house of Ponta Delgada, at an elevation of 20 feet above the sea, is exhibited a *fixed* white light, visible in clear weather from the distance of 5 miles. This light is not easily distinguishable from those of the town.

From a lighthouse (near the extremity of the breakwater in course of construction), a fixed *red* light (movable) is exhibited from an elevation of 47 feet above the sea, visible from the distance of 9 miles in clear weather.†

Dock.—There is a floating dock at Ponta Delgada, capable of receiving vessels of 1,500 tons burden.

Anchorage.—The road of Ponta Delgada off the city has good holding ground; the usual berth is in 20 to 30 fathoms, from three quarters of a mile to one mile off shore; small vessels anchor nearer in, the soundings decrease gradually, the 5-fathom line being generally one cable off shore. The entrance points of the bay bear from each other N.W. by W. and S.E. by E., so that the anchorage is exposed to winds from the southward of that line, but steam vessels may ride in 12 fathoms during ordinary winds, with the south extreme of the breakwater in line with Delgada point.

There are several rocky banks, with 12 to 15 fathoms water over them, situated on the meridian of San Pedro point at distances of from a quarter to half a mile from the shore, and which should be avoided when taking up a berth.

Buoy.—A mooring buoy lies in 18 fathoms, with the south extreme of the breakwater bearing N.W., distant 4 cables.

Caution.—If obliged to slip and quit the anchorage to avoid a southerly gale, it is recommended to run to the westward of the island, as

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* *See* plan:—Ponta Delgada on Admiralty chart, No. 1,854; scale, *m* = 3·9 inches.

† On December 9th, 1879, the lighting apparatus of this red light was destroyed during a storm, and notice was given that the light would not be re-established in less than two months. An ordinary light is temporarily exhibited from the breakwater lighthouse.

S.W. gales generally shift to N.W., which is a fair wind for regaining the anchorage.

Directions.—When beating up for Ponta Delgada road, the rocks off Galera point, its eastern limit, should be given a berth of three quarters of a mile; at half a mile off shore, N.W. by W. ¼ W. 1⅓ miles distant from Galera point, a rock has been reported, but was not found during the Admiralty survey of 1844.

Water may be obtained and is brought off by native vessels.

Arayal, situated 7 cables east of Delgada point, and close east of San Bras fort, is a small basin, with a depth of 6 feet in it, where good landing may be had at all times, and where small vessels can be repaired.

Breakwater.—In 1845 the construction of a mole for a harbour of refuge was commenced, but it is not yet completed though making rapid progress, and in its present advanced state affords good shelter; it extends in an E.S.E. direction from the shore immediately west of the citadel.

Shoals.—San Pedro point, surmounted by a fort, lies 4 cables E. ¼ S. from Arayal, and midway between on a point in a shallow bight stands the custom-house, to the westward of which there is a small camber with a depth of 9 feet in it; a shoal of 6 feet, with 2 fathoms inside it, lies 100 yards south of the custom-house point; and at one cable S.S.W. of San Pedro point there is a shoal of 3 feet, with 4 fathoms inside it.

Signals.*—The following code of signals is in use at Ponta Delgada (1874), those from the shore being shown from a flagstaff on the custom-house quay:—

From vessels to the shore.

1. Requiring pilot.—National flag at mizen mast head, and a distinctive light below it.
2. When damaged.—Distinctive light at mizen mast head with national flag below it.
3. When making much water.—Distinctive light at stern, with national flag below it.

From the shore to vessels.

1. Red flag, pendant below.—Seek favourable position for receiving pilot.
2. Pendant with red flag below.—Not possible to send pilot.
3. National flag with red flag below.—Stand off to sea immediately.
4. Red flag.—It is possible to enter.
5. Black ball with red flag below.—Vessels must not enter artificial harbour.

Rosto do Cão point lies E. by S. ½ S. 1⅙ miles distant from San Pedro point; the coast between is uneven, and fringed with rocks. The point is the extreme of a yellowish bluff 78 feet high, separated from the mainland by a narrow gap which dries at low water, it is steep-to and at one cable off shore the depth is 7 fathoms, sand.

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* Annonce Hydrographique, Paris, No. 48 of 1874.

Port Caetano, Quarantine ground.—In the bight, one mile eastward of Rosto do Cão point, is situated a small port, where vessels subject to quarantine anchor in 12 fathoms, one-third of a mile off shore, or in 29 fathoms, sand, at 5 cables off shore.

Coast.—From port Caetano the coast trends in a direct line S.E. by E. for a distance of $1\frac{3}{4}$ miles to Alagoa point, a low black lava point, eastward of which is a landing place in a cove known as port Carneyros and the more extensive bay of Alagoa, with a town of the same name at its head.

From Alagoa bay the coast composed of reddish cliffs with a narrow beach at their base, extends S.S.E. for a distance of $2\frac{1}{4}$ miles to Agoa point a bold cliff forming the western entrance point of port Cabassos.

A sunken danger has been reported as lying half a mile south-west of Agoa point, but no indication of its existence was found during the Admiralty survey of 1844.

Galera point, a steep rugged point fronted by rocks above and below water, is the south-west extreme of San Miguel island; in port Cabassos, a cove lying westward of it, landing can be effected in front of the Villa do Agoa do Pao.

Pyramida point, lying E. by S. $\frac{1}{2}$ S. from Galera point distant $2\frac{1}{10}$ miles, is formed by a narrow ridge surrounded by high reddish cliffs and terminating in a remarkable high-pointed rock.

A shoal, on which there are two heads of 6 feet, and which breaks heavily in bad weather, extends south and south-west from Pyramida point for a distance of two cables. The coast between Galera and Pyramida points forms a bay half a mile deep, at the eastern part of which there is a beach about a quarter of a mile long.

Villa Franca.—From Pyramida point the coast is nearly straight for 5 miles to Garca point (a small rocky point surrounded by reddish cliffs), where landing may be effected; nearly midway is situated Forca point, to the eastward of which is built the town of Villa Franca, of considerable importance, and possessing a public hospital. The town has been twice destroyed by volcanic eruptions; in the interior of the island, $3\frac{1}{2}$ miles north of the town, is a crater with 15 fathoms water in it, named Lagoa do Fogo. There is a beach of sand and shingle about 300 yards long in front of Villa Franca, with rocks and large stones extending a short distance from it.

Supplies.—Water and all kinds of provisions can be obtained at Villa Franca.

Villa Franca islet, half a mile in circuit and about 180 feet high, lies 3 cables S.S.W. $\frac{1}{2}$ W. from Forca point, with from 3 to $4\frac{1}{2}$ fathoms between them. The islet is a great natural curiosity, having been a volcano, the summit of which has fallen in, leaving a basin in its centre, with an entrance to it on the north-east side of the islet, fronting the town of Villa Franca; the depth in the basin is 6 fathoms, and the entrance is just wide enough to admit small vessels.

Villa Franca road.*—During fine weather small vessels lie between Villa Franca islet and the shore, but there is more space off Forte da Area, the eastern limit of the town and roadstead; a good berth is in 10 fathoms sand, with the north-east extreme of Villa Franca islet, bearing W. ¾ N., and Forte da Area bearing N.E. by N., distant half a mile; it should be borne in mind that from the Forte da Area, rocks above and below water extend S.S.W. for a distance of 2 cables.

Lobeira rock.—Lobeira point, a small rocky bluff, lies E. ¾ S. from Garca point, distant 2⅓ miles, and 3 cables S. by W. from it, is situated Lobeira rock, a few feet above water, with 5 fathoms between it and the point, and 14 fathoms close south of it.

Fayal point lies E. by S. ½ S. distant 5½ miles from Lobeira point, the coast between receding one mile; in this bight is situated the village of Povoacão.

Ribeira Quente point, a comparatively low narrow point surrounded by inaccessible cliffs, lies 1½ miles east of Lobeira point; landing can be effected on its east side, and there is a stream of warm water westward of it.

Retorta point, the south extreme of St. Michael island, lies 2 miles E. ¾ S. from Fayal point, it is high and steep, with a few rocks close to its foot; in the bay between there is a stream and the village of Fayal; at half a mile inland from the point is situated Pico de Nunez, 2,220 feet high, conspicuous when seen from the westward. The coast for about half a mile north-east of Retorta point is bold and steep, but not cliffy, on its south-west side there is a landslip fronted by a low cliff. From Retorta point Formigas rocks bear S. ½ E., distant 10¾ miles, the channel between being clear.

East coast.—From Retorta point the coast trends north-east for 3 miles to Lombo Gordo point, a steep cliff rising rapidly to a height of 1,347 feet; a few rocks lie close to the foot of the cliffs forming the coast between these points; Marqueza point, a steep cliff 400 feet high, lies 1½ miles N.E. by N. ¼ N. from Lombo Gordo point, and Arnel point (which is also cliffy and surrounded at its base by a stony beach of unusual width) one mile further in the same direction; there is an unsheltered bay in front of the village of Nazarete, south of Arnel point.

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* *See* plan:—Villa Franca road on Admiralty chart, No. 1,854; scale, *m* = 2 inches.

LIGHT.—From a lighthouse on Arnel point, at an elevation of 219 feet above the sea, is exhibited a *fixed* white light, varied every *two minutes* by a flash; the light should be visible from seaward in clear weather through an arc of 240° from a distance of 18 miles; the flashes should be visible for a distance of 25 miles.

Ribeira point, the north-east extreme of San Miguel island, is 280 feet high and faced with cliffs; it lies 1¾ miles north from Arnel point with a shallow bay between, having a remarkable ravine and a small river in it.

Ajuda point.—From Ribeira point the rocky coast, faced by beaches, trends W.N.W. for 8 miles almost in a direct line to Ajuda point that is low, sharp, and steep-to; landing may be effected in a cove close eastward of it.

North-east coast.—This side of San Miguel island forms a large bight, 4½ miles deep and 23 miles wide, Bretanha point, its western limit, bearing from Ajuda point, its eastern limit, N.W. by W.

Morro Grande point, bearing W. by N. ½ N., distant 8½ miles from Ajuda point, projects 1½ miles from the general curve of the bight; it is a fine bold head faced by cliffs.

The most prominent projections on the cliffy coast between Ajuda point and Morro Grande are Maya point (a double point with a remarkable narrow ledge of rocks extending about 170 yards in a westerly direction from its north-west extreme) and Formosa point, which has a broken rugged coastline.

The square tower of a monastery, 498 feet above the level of the sea and about three-quarters of a mile south of Ajuda point, is a conspicuous object on this part of the coast.

Landing in this bight may be effected close east of Maya point (4 miles westward of Ajuda point); at 6 miles west of Ajuda point in a bight close east of Formosa point; also south-east of Morro Grande, under the shelter of Portinha point.

Ribeirinha point, narrow and cliffy, is situated half a mile west of Morro Grande with a small bay between.

Ribeira Grande, the second town of importance on San Miguel island, is built in the south-east corner of the bight west of Ribeirinha point and 1½ miles distant from it. There being no anchorage off this town, it receives its commercial supplies from the towns on the south side of the island; it is only when the sea is very smooth that landing can be effected.

Coast.—Between Ribeira Grande and Fanais point the most projecting points are the bold reddish headland of Morro do Rabo do Peixo, with a shoal of 4 fathoms lying N.E. ½ E. from it distant half a mile, and Calheta point which is low, shelving, and surrounded by rocks.

Fanais point, a narrow, rocky, yellowish point, projecting 350 yards from the line of coast and with steep cliffs on each side of it, at the head of the bight, lies 7 miles W. by N. ¾ N. from Morro Grande ; on the east side of it is a landing place in front of the village of San Pedro.

Morro das Capellas, lying 2½ miles N.W. ½ W. from Fanais point, is a small peninsula, faced by perpendicular cliffs much indented by the sea, and westward of it is a bay that affords the best landing on the north-east side of the island ; the village of Capellas is situated about half a mile southward of it.

Bretanha point.—From Morro das Capellas the coast forming the western shore of the bight trends north for 3 miles to Agulha point, (a low rocky point extending from high cliffs) from which Bretanha point, 380 feet high and faced by steep cliffs, the northern extreme of San Miguel island, bears N.W. ½ N., distant 3⅓ miles.

The square tower of a church on a hill at Ajuda, midway between these points, is a conspicuous object on this part of the coast.

Landing may be effected in a cove midway between Bretanha point and Agulha point, at the foot of a cone (Pico Vermelho) 858 feet high.

Lombinha rock, a large flat rock above water surrounded by sunken dangers which usually break, is situated one third of a mile off shore at three-quarters of a mile eastward of Bretanha point ; between it and the rocks which lie close off the coast there is a depth of 4 fathoms.

North coast.—Mosteiros point, a low projecting point surrounded by rocks, lies W. ¾ N., distant 2 miles from Bretanha point, the coast between forming João Bom bay, at the head of which rises Pico da Maffa, which forms a good landmark ; near the point are some rocks, and southward of it a village ; the coast from Mosteiros point extends in nearly a direct line S.W. by W. for 3 miles to Ferraria point, the north-west extreme of San Miguel island.

Mosteiros islet, small, dark, and cliffy, lies 5 cables off shore, and is situated one mile W.S.W. from Mosteiros point ; there is foul ground between it and the shore.

Varzea point, situated midway between Mosteiros and Ferraria point, has a reef extending 3 cables northward of it.

Caution.—The north coast of St. Michael island should not be approached within a distance of one mile, or to a less depth than 20 fathoms.

Soundings.—On the north and south sides of St. Michael the 100-fathom line follows the configuration of the island, at an average distance of about 1½ miles from the shore. The soundings on the bank extending from the east coast of the island are somewhat irregular, as at a distance of 5 miles east from Ribeira point the depth is 36 fathoms, with from 50 to 60 fathoms close to it, 90 fathoms is found midway to the shore, and the 100 fathom line is one mile east from the depth of 36 fathoms.

On the meridian of Villa Franca islet there is a depth of 50 fathoms at a distance of one mile, and 200 fathoms at about 1¾ miles from that islet.

Off Delgada point the bank deepens from 50 fathoms at one mile, to 200 fathoms at 1½ miles from the shore; whence to the north-west extreme of the island, a depth of 200 fathoms is found at about 2½ miles off shore.

On the bank extending from the north-west extreme of the island, and at one mile off shore, on the site of Sabrina island, is a depth of 15 fathoms; at 5 cables north of this shoal there are 100 fathoms, and at one mile from it, 200 fathoms.

The bank of soundings extends north-west from Ferraria point, with irregular depths for a distance of 2½ miles; at 3½ miles from the shore no bottom was obtained at 230 fathoms.

Northward of Bretanha point the depth is irregular; at one mile distant there is 22 fathoms, with 25 fathoms between it and the shore; a depth of 100 fathoms is found at a distance of 1½ miles, and at about 2 miles from the shore in that direction there are 240 fathoms.

SANTA MARIA (SAINT MARY),* the south-easternmost island of the Azores, lies 43 miles S.S.W. of the south-east extreme of St. Michael; the island is about 24 miles in circuit and the most elevated part, near the centre, is the double-peaked mountain of Pico Alta, 1,870 feet high; it is the summit of a ridge that rises abruptly from the south-east extremity of the island, and terminates at the north extreme; the land on the west side of this ridge falls suddenly, and continues flat to the western extreme of the island, terminating in cliffs about 100 feet high. Santa Maria is fertile, producing wheat, Indian corn, and other kinds of grain. The principal town and roadstead is situated on the south side of the island, near the south-west extremity.

The aspect of St. Mary island is on all sides bold; the central peak distinct; the subordinate range high and of varied outline and the coast abrupt and precipitous, with fallen masses at its base. When seen from the southward, the western part of the island appears as a long low point.

Geologic formation.—Unlike the other islands of the Azores, St. Mary is of trap formation, and contains in its beds of marine shells, proofs of its elevation from the sea. It is necessary, with reference to its exceptional nature, to observe that the basalt, columnar and massive, which appears at its base, is also found in a narrow locality at St. Michael island. There is also an exact identity in the older porphyry or porphyritic lava of St. Michael and that which has formed the Pico Alta of St. Mary island; while the decomposed syenite found at the latter place, closely resembles some of the ejected masses of the former island.

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* *See* Admiralty chart:—Santa Maria island and the Formigas, No. 1,865.

Diseases.—The inhabitants do not appear to be subject to severe internal diseases, but some of an external eruptive character are both widely spread and aggravated. As a consequence, perhaps, of their poor diet, the summer no sooner sets in than the itch becomes almost universal. The local pharmacopœia, which is composed chiefly of herbs, is insufficient to check its progress; and the only cure expected is the return of winter, with its specific of colder weather.*

Population.—The population of St. Mary island numbers between 7,000 and 8,000.

Castello point, the south-east extreme of the island, is high, and surmounted by a detached peak; off the east and south sides of the point are sunken rocks, but northward of it vessels have anchored in 8 fathoms sand, with the point bearing S.W. by W. distant 5 cables.

Sul rock is a small round islet situated 3 cables W. by S. from Castello point and 1½ cables off shore, with 8 fathoms between it and the coast and 12 fathoms close southward of it.

Malha point, lying N.N.E. ½ E from Castello point distant two thirds of a mile, is a low black point fronted by rocks; from this point to San Lourenzo bay the coast is clear of off-lying dangers and rises boldly from the sea.

Malha rock, a few feet above water, lies one mile N.N.E. from Castello point and 3 cables off shore, there are 9 fathoms in mid-channel between it and the rocky shore.

Feiteira point is a bold rocky point with a rock at its base; it lies N. by E. ½ E. from Malha point distant 1$\frac{1}{10}$ miles; from this point the coast which is cliffy, trends in a N. by W. direction for a distance of 2 miles to San Lourenzo islet, the most projecting points of the intermediate coast being Gorda and Cedres points, both of which are high and steep.

Souza point, which is bold and rocky, bears N. ¼ W. from Feiteira point distant 3½ miles, the intervening coast receding and forming San Lourenzo bay.

A rock which breaks, lies about a cable north of Souza point, and another at the same distance south of it.

San Lourenzo islet lies 1$\frac{1}{6}$ miles N. by W. ½ W. from Cedres point; it is steep and cliffy, 275 feet high, one-third of a mile in circuit, and half a cable off shore, with a boat passage of 6 fathoms between; at 100 yards northward of the islet is situated a rock, and off at the south-east extreme are two small rocks.

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* Mr. T. C. Hunt, H.B.M. Consul, 1845.

San Lourenzo bay,* containing the town of San Lourenzo, is formed by Romeiros point (which is high and bold with two rocks above water at its base) situated abreast of San Lourenzo islet, and San Lourenzo point, which latter bears North from the islet distant 7½ cables; the bay is 4 cables deep, its coast generally rocky, with sandy beaches; in the north part are two sandy coves, the northern of which affords landing.

Anchorage.—The bottom in San Lourenzo bay is generally sandy, and the coast steep-to, the 5-fathoms line lying 2 cables from the head; between the outer points, the depth is from 9 to 15 fathoms, increasing gradually to seaward; a berth for temporary purposes may be found in 13 to 15 fathoms, off the centre of the bay.

Water of the best quality may be easily obtained by digging holes in the sand on the beach; and, generally, from the mountain streams.

Coast.—From San Lourenzo point, which is low and cliffy, to Souza point the coast is formed of lofty cliffs.

North coast.—From Matos point, the north-east extreme of the island, the coast trends W.N.W. for 4 miles to Frades point, consisting of alternate rocky points and small bays. Frades point is 150 feet high, and appears as an island.

Lagoinhas islet, 277 feet high, and surrounded by steep inaccessible cliffs, lies 1½ miles N.W. ½ W. from Matos point, separated from the shore by a passage 3 cables wide that is blocked by rocks; its north extreme is a low projection from the cliffs, with 15 fathoms at 3 cables from it, but on the bearing of N. ¼ W. distant one mile from it, there is a rocky bank of 6 fathoms, with 14 and 20 fathoms around it.

The most prominent points between Lagoinhas islet and Frades point are Ribeira point, a steep bluff 700 feet high, and Tamuscal point which is formed of reddish cliffs 400 feet high.

Landing may be effected in the bay east of Ribeira point; in the western part of the bay west of Ribeira point; and in the bay eastward of Frades point.

Coast.—The coast trends in a westerly direction from Frades point to Cabrestante point, the north-west extreme of the island, which is low and surrounded by rocks, the outer of which (Maldebarca rock) is above water and lies a quarter of a mile from the shore. From Cabrestante point the coast trends to the south-westward, and rising slightly forms Pendurados point, at a distance of about three quarters of a mile. The coast from Frades point to Pendurados point is fronted by a bank of from 2 to 4 fathoms, extending about a third of a mile from the shore, and a rock which breaks, lies 3 cables from the shore W. by N. ½ N. from Frades point distant 1⅓ miles, with 19 fathoms at three quarters of a mile north of it.

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* *See* plan:—San Lourenzo bay, on Admiralty chart, No. 1,865; scale, $m = 2{\cdot}9$ inches.

Landing may be effected to the southward of Pendurados point.

From Pendurados point the coast formed by cliffs trends in an almost unbroken line to Villa island.

Villa island, half a mile in circuit, lies off the south-west extreme of St. Mary island, and is situated 2½ miles S. by W. from Pendurados point; the island is cliffy, 196 feet high, and separated from the shore by a boat passage 1¼ cables wide, with 5 fathoms water in mid-channel.

Villa do Porto bay,* which contains the principal town of St. Mary island, is situated one mile eastward of Villa island; Malmerendo point, its west limit (a cliff 149 feet high, surmounted by a fort), lies 7 cables E.S.E. from the south extreme of Villa island; and Marvao point (from which a ledge of black rocks extends about 130 yards in a south-westerly direction), the east extreme of the bay, is situated 8 cables further in the same direction. The bay is 4 cables deep, contracting to 2½ cables in width at its head, where, to the westward of the town, is situated the castle of Santa Luzia; both sides of the bay are cliffy, the western shore is clear, but the head and east shore are fringed with rocks; between the entrance points the depth is 8 to 12 fathoms; the 5-fathom line is found at 1½ cables from the head; and from the north-east corner, rocks extend one cable from the shore.

Anchorage.—The bay of Villa do Porto is quite exposed, and only used in summer by small vessels; the best berth is in 30 fathoms, sand, at three quarters of a mile off shore, with the castle open of Marvao point, bearing North; but the bank is very steep, and the bottom to the eastward rocky; for this reason San Lourenzo bay is considered a preferable anchorage.

Tides.—It is high water, full and change, in Villa do Porto bay at 0h. 15m.; springs rise 6 feet.

Supplies in moderate quantities may be obtained at Villa do Porto; partridges are generally plentiful.

Prainha bay.—Malbusco point, high and surmounted by a peak, lies S.E. ¾ E., distant 3½ miles from Marvao point, the coast between recedes one mile forming Praya bay, in which the only hidden danger is Pescador rock. The eastern side of Prainha bay is cliffy, the western side is fronted by beaches. From Malbusco point a straight coast extends in an E.S.E. direction for 2½ miles to Castello point, before described.

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* *See* plan.—Villa do Porto bay, on Admiralty chart, No. 1,865; scale, $m = 2 \cdot 9$ inches.

Pescador rock.—A sharp rocky pinnacle, with 3½ fathoms on it, 20 fathoms between it and the shore, and 140 fathoms one cable southward of it, lies 1⅙ miles N.W. ½ W. from Malbusco point, and 5 cables off shore.

Malmerendo point in line with the north extreme of Villa island, bearing N.W. ½ N. leads one mile south of this rock.

Soundings.—On the north side of St. Mary island the 100-fathom line lies about 3 miles from the shore, the soundings between being irregular; at 3 miles N. by W. ½ W. from Frades point, and on the meridian of the north-west extreme of the island, is a rocky bank on which the least depth found was 33 fathoms; at half a mile seaward of this there are 280 fathoms sand; and between it and the shore 70 fathoms. Around the other portions of the island the 100-fathom line lies generally about a mile from the shore.

Sea worms, about 18 inches long, with orange spots on them, are generally numerous near St. Mary island, and serve to indicate proximity to the island.

FORMIGAS BANK* lies E. by N. ½ N. from the north-east extremity of St. Mary island distant 20 miles. The soundings on this bank are very irregular, and traced to the depth of 200 fathoms, it was found to extend 7 miles from north-west to south-east, by about 3 miles at its greatest breadth. Between the bank and St. Mary island no bottom was found at a depth of 320 fathoms.

Formigas rocks.—Near the north-west margin of Formigas bank lie a group of black rocks, extending in a N.N.E. and S.S.W. direction, about 800 yards in length by 150 yards in extreme breadth.

The southernmost of this group, for an extent of about 350 yards, forms a closely connected cluster of rocks, having a small bay on the west side. The northern rocks are more separated from each other, and the outline of the group exhibits a few hummocks, the southern of which, 27 feet above high water, lies E.N.E. distant 20½ miles from Matos point, the nearest point of St. Mary island. The most elevated of the group (Hormigon) is 35 feet high, and stands on their eastern side, about 200 yards from the northernmost rock; it is somewhat more isolated than the others, and slopes to the southward.

Landing.—With smooth water there is no difficulty in landing, particularly on the southern rocks; but during strong winds or a high swell the sea rolls over them all, leaving a black bare surface entirely devoid of vegetation.

Soundings.—A rocky shoal, partly visible at low water, lies S.S.W. of the southern Formiga rock, distant 130 yards, with 15 fathoms between it and the rock. At 3 cables S.S.W. of the south Formiga rock is situated another small rocky bank of 4 fathoms, steep-to, except on a line from it to the Formigas, where the soundings are very irregular, varying from 7 to 14 fathoms.

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* *See* plans:—Formigas bank and Dollabarat shoal, on Admiralty chart, No. 1,865; scale, *m*=6 inches.

North of Formigas rocks a ridge extends N.N.E. with varying depths upon it but no dangers ; at a distance of 300 yards from the northernmost rock there are 18 fathoms, quickly deepening to 30 and 50 fathoms. On the meridian of the rocks the 200-fathom line lies about 2 miles north of them. On the east and west side they are quite clear, with deep water close to, the 200-fathom line lying not more than half a mile off the west side ; at one cable from the rocks there is a depth of 50 fathoms.

Dollabarat shoal is very dangerous in smooth water when its position is not indicated by a breaker, but in stormy weather the sea breaks over it with great violence. Its southern head, consisting of two or three rocky knolls, which at low water springs have only 11 feet water on them, lies S.S.E. from the south Formiga rock distant 3¼ miles. At low water their position is marked by several white patches, which may be distinctly seen, especially when the sun is shining. This shoal is near the south extreme of a rocky ridge, which extends from it N.E. ½ N. for 1½ miles, at which distance the depth is 20 fathoms, increasing suddenly to 140 fathoms ; the ridge is narrow, with uneven soundings from 14 to 25 fathoms on it. The whole bank of the Formigas is apparently a submarine mountain, whose varied elevations approach the surface of the ocean in several places. The shoal of Dollabarat is the most southern of these ridges, and the mountain has a steep but tolerably regular descent from it to the north-east, east, south-east, and south ; the south-eastern slope being the most gradual.

Between Formigas rocks and Dollabarat shoal there are several shoals with from 16 to 30 fathoms on them and 40 to 50 fathoms between them, the least water (16 fathoms) lies S.S.E. from south Formiga rock, distant 1⅙ miles.

Nature of bottom.—The quality of the bottom over Formigas bank is principally rocky, with frequent casts of fine white sand, broken shells, and small pieces of branch coral.

Reported dangers.—After the survey of Formigas rocks and bank had been completed, much time and labour was spent, under favourable circumstances, in unsuccessfully searching for rocks which had, prior to that time (1843), been reported to exist in the vicinity ; the reported position of Tullock reef (about 10 miles E.N.E. from the highest Formiga rock) was carefully sounded over without obtaining any indications of its existence.

CHAPTER II.*

CAPE SPARTEL TO CAPE BOJADOR.

VARIATION IN 1880.

Cape Spartel	18° 10′ W.	Cape Bojador	18° 50′ W.

CAPE SPARTEL† (Raz-el-Skukkar), the north-west extremity of Africa, and the south-western limit of the strait of Gibraltar, terminates in a mass of black conical-shaped rock, which, seen from the north and south, appears detached like an islet. It is commanded by high land which attains an elevation of 1,068 feet above the sea, being part of a chain running east and west; south of the cape the land falls rapidly, forming an extensive plain, in the middle of which is situated mount Nipple, remarkable by its isolation and conical form. The cape is skirted by a reef which extends from it about 2 cables, and foul ground also extends to the south-westward. With the lighthouse between the bearings of East and E.S.E., the shore should not be approached within three-quarters of a mile. The high land over cape Spartel is conspicuous when bearing S.E., as there are two remarkable gray patches about a third of its height from the summit.

Spartel bay.—Half a mile south of cape Spartel is situated a sandy bay, where small vessels find shelter from easterly winds, in 6 or 7 fathoms water, at half a mile from the beach; heavy squalls, however, blow off shore, and a continual swell makes it difficult to land, even when not opposed by the Moors.

LIGHT.—Half a mile eastward of the west extreme of cape Spartel is situated a square stone tower, from which is exhibited, at 312 feet above the sea, a *fixed* white light, which should be seen in clear weather from a distance of 20 miles; from it the lighthouse on cape Trafalgar bears N. ½ E., distant 24 miles.

Soundings.—The 100-fathom line lies about 3 miles westward of cape Spartel, but immediately southward of the cape the bank within that depth increases its breadth to about 20 miles, and the 100-fathom line continues nearly parallel to the shore for a considerable distance.

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* Chapter 2 of this volume, being in part identical with Chapter 2 of the Mediterranean Pilot, Vol. I., and with Chapter 6 of the Sailing Directions for the West Coasts of France, Spain and Portugal, the mariner should consider which book contains the latest information.

† *See* Admiralty chart:—Strait of Gibraltar, No. 142; Africa, Sheet 1, Gibraltar strait to Gambia river, No. 1,226; and Africa, West coast, Sheet 1, Cape Spartel to Azamor, No. 1,227.

Coast.—North of cape Spartel the coast is high and composed of uninterrupted steep cliffs, at the base of which a little beyond the cape, are some black pinnacle rocks above water named the Needles. About 1¼ miles north-east of the cape is situated Fraylecito point, at the termination of which is a small black islet surrounded by rocks. The coast thence turns eastward for 3 miles, and is high and irregular, but not so cliffy, to Judios point; the most projecting part between being Pigeon point, remarkable and well defined when seen from east or west. Judios point is more salient and remarkable than either of the other points, and is known from seaward, rather by the white cliffs that form it than the point itself, which is only well defined when bearing east or west. The coast between cape Spartel and a point situated one mile east of Pigeon point is steep-to.

Judios bay.—At nearly three-quarters of a mile eastward of Judios point is situated Judios bay, which has a small sandy beach at its head, the only one on this portion of the coast. A small stream of the same name as the bay discharges through it, and runs down a narrow valley which separates the mountain of cape Spartel from the Mesa de Marchan (table land of Marchan) which is contiguous to Tangier. These two heights form good points for distinguishing the coast from seaward, and are sufficiently remarkable to be recognisable even at night, should the weather be clear. The valley through which Judios rivulet flows, presents a remarkable break, which completely separates the mountain of cape Spartel, that is uneven and irregular, from Mesa de Marchan, which is level and not so high, being only 342 feet above the sea.

On the eastern point of the bay are situated the ruins of a fort, and a marabout tower stands on the slope of the western portion of Mesa de Marchan.

TANGIER BAY.*—A white and reddish cliff commences at Judios bay and terminates at Tangier point, distant one mile to the eastward; when seen from a distance it appears like a patch in the middle of the coast. The shore is here skirted by reefs, and Tangier point terminates in low rocks. The town of Tangier stands near the sea and on the eastern slope of the table-land of Marchan, the most remarkable objects from their height being the castle (la Casbah), and a mosque at the north-west angle of the town, the north-east angle being at Tangier point. The houses standing above each other and being entirely white are seen from some distance, but when approaching from the westward, the table-land of Marchan prevents the town from being seen until abreast of it.

The bay is 3 miles wide and one deep, Tangier point forming its western extremity, and Malabata point its eastern; the latter bears from the former point E. by N. ¼ N. The bay from the offing appears much deeper than it is, from being surrounded by high land; nearly all its western shore is a clean sandy beach, but eastward of fort Arabi-el-Said (2½ miles east of the town) rocks and foul ground extend 1½ cables from the foot of the cliffs at the coast line.

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* *See* Admiralty plan :—Tangier bay, No. 1,912; scale, $m = 3{\cdot}5$ inches.

Tangier point is foul on its northern side for a distance of 2 cables, and eastward and southward of it, for a distance of three-quarters of a mile, the 3-fathom line is found at a distance of 3 to 4 cables from the shore.

There is an isolated conical hill about two-thirds of a mile inland over the head of the bay, named mount Direction, which serves as a mark for the anchorage; and a little east of it is situated another hill not so high, on which there is a whitish tower. Between these two hills winds a small stream, which falls into the sea near the ruins of old Tangier; it is crossed by two bridges, one of which is white, and that nearest the sea in ruins.

Another rivulet joins the above, immediately east of old Tangier. There are two batteries on the eastern side of Tangier bay; one (Arabi-el-Said) at the termination of the sandy shore, close to which there is a tower in ruins, and another half a mile farther to the north-east.

From the foot of the battery at Tangier point, rocks which cover at high water extend, and upon them are the remains of an old mole, extending 2 cables eastward, and affording shelter for small craft from northerly and north-west winds. About 1½ cables farther southward is situated another reef consisting of a group of rocks, one of which is 12 feet high. Between the two reefs is a curved beach, off which the water is shallow, but where small vessels load and discharge cargo; the custom house is situated on the beach, and this is the only place where landing is permitted. Easterly and south-east winds send in a sea, when the beach cannot be approached without considerable risk. The town of Tangier (Tanjah of the Arabs and Tingis of the Romans) is enclosed by walls, and may contain a population of about 10,000. It is the residence of the Consuls-general and Consuls of the principal nations, and a few European merchants reside here. Small supplies may be obtained. The gates of the town are locked at sunset.

LIGHT.—From the extremity of a wooden landing stage near the custom house at Tangier is exhibited, at an elevation of 20 feet above high water, a fixed *red* light, visible in clear weather from a distance of 3 miles.

Trade.—In 1875 the value of the imports at Tangier amounted to 331,331*l*., and that of the exports to 222,457*l*.

Bourée rock lies about half a mile from the south shore of the bay. It is about a cable in circuit, and the least water on it is 3 feet, though the sea seldom breaks on it. From its shoalest part, mount Direction bears S.W. ⅓ S.; White tower (marabout) east of mount

Direction S. by W. ¾ W., and fort Arabi-el-Said S.E. by E. ¾ E. distant 8 cables. There is a depth of 2 fathoms for a distance of about three-quarters of a cable west and south-east of the rock, from 4¼ to 6½ fathoms water between it and the shore, and about the same depths at half a cable north of it.

Anchorage.—Tangier bay is the only anchorage of any importance on the south coast of the strait of Gibraltar, and where vessels of any size may anchor. Although exposed to winds from N.W. round by north to N.E., it affords security with those from other points of the compass. N.W. winds send in much sea, that is felt even with the wind as far round as S.W.; those between North and N.E. do not last long nor send in much sea. A vessel may anchor anywhere in the middle of the bay in about 7½ fathoms water, sand and good holding ground, with mount Direction bearing about S.S.W. A large vessel should keep Judios point open of the fort in ruins on the east point of Judios bay, and also Europa point open of Malabata point. Small vessels anchor nearer the shore. During the winter months vessels should be prepared to leave quickly.

A vessel entering Tangier bay during an easterly gale, will find convenient anchorage off a small beach about a mile southward of Malabata point, in 8 or 10 fathoms water, where there is better shelter than further westward, and it is a fair position from which to continue the voyage when the wind slackens or changes. The 3-fathom line in this eastern portion of Tangier bay lies at a general distance of about 2 cables from the shore, but at 1$\frac{1}{10}$ miles south of Malabata point 2¾ fathoms is found at nearly 3 cables from the coast; east and west of which and more in the centre of the bay are two shoals with 4¾ fathoms water on them. When working out of the bay and standing towards old Tangier, keep Europa point open north of Malabata point to avoid Bourée rock, or by not bringing Malabata point to bear south of N.E. by E. ½ E. a vessel will pass 2 cables north of it.

Supplies.—Fresh provisions in small quantities can be obtained at Tangier, but water is scarce.

Tides.—It is high water, full and change, at Tangier point at 1h. 42m.; springs rise 8¼ feet, neaps 5 feet.

The flood stream in the offing north of Tangier bay runs from east to west, and the ebb in the reverse direction, turning in mid-channel at high and low water by the shore. Three hours after it is slack water in the offing or at about half ebb by the shore at Tangier, the ebb stream within the bay runs from east to west or in a direction contrary to the offing stream. Northward of Judios point, the tidal stream is strong, causing eddies both on the flood and ebb resembling breakers, however little sea there may be; this occurs more especially during springs.

Malabata point, at the eastern extremity of Tangier bay, is a bold prominent headland terminating in cliffs and bordered by rocks, which extend 2¼ cables from it in a south-westerly direction, it has on it a battery and a circular white tower, the land rising from the point to a height of 792 feet.

Almirante rock.—A rocky shoal with 3½ to 4¾ fathoms water on it, lies N. ½ W. from the tower on Malabata point, distant 7 cables. There is generally a swell over it, and with strong winds from the westward the shoal breaks. Between Almirante rock and the shore there are from 8 to 12 fathoms; no large vessel should, however, use this channel except in cases of necessity, but pass Malabata point at a distance of a mile in 12 to 15 fathoms water.

JEREMIAS ANCHORAGE, about 3½ miles southward of cape Spartel, is much resorted to by vessels prevented from entering the strait of Gibraltar by strong easterly winds. At a mile from the shore there are about 20 fathoms water, over clean sandy bottom, and good holding ground. During the prevalence of easterly winds it is preferable for vessels wishing to enter the strait to keep over on the African coast rather than the Spanish, as it is free from danger, and they are in a better position to profit by any change in the direction or force of the wind; for this purpose it is prudent for a sailing vessel to keep under sail.

Directions.—When approaching the strait of Gibraltar from the westward if a levanter comes on, stand well to the southward, and work up to bring mount Nipple to bear E. ½ N. before anchoring. From this position to the southward heavy squalls are not generally experienced. A good berth may be had in 24 fathoms, and at half a mile from the shore there are 7 fathoms.

H.M.S. *Vulture* in 1872 anchored at Jeremias anchorage in 14 fathoms water, with a white marabout tower (the only building in the vicinity), bearing S.E.

Arzila.—The coast from cape Spartel trends nearly straight in a S.W. by S. direction for 19 miles to Arzila, and, with the exception of a few rocky projections, is formed by a clean sandy beach with a line of low hills, which from the distance of half a mile inland, slope gradually to the beach. Thirteen miles further inland there is a range of very conspicuous mountains, the loftiest of which, named Jebel Habib, is about 3,000 feet about the level of the sea. Another peak, mount Raven, lies 6 miles farther northward and 10 miles inland, and is about 2,200 feet high. Close north of the town of Arzila there is a castle built by the Portuguese, but now in ruins; date trees, which rise above the walls, are growing in the court. Under the southern angle of the castle is a whitewashed tomb of a Mohammedan saint. The country in the neighbourhood of the town is well wooded, and much land is laid out in gardens.

Anchorage.—There is good anchorage on this part of the coast; a good berth is in 15 fathoms, on a bottom of sand and small shells at 1½ miles from shore, with cape Spartel bearing N.E. ½ N., and the town of Arzila S. by W. ¾ W. distant 5 miles; further to the southward, in 13 fathoms, coral rock will be found mixed with gravel, when the centre of Arzila town bears S. ¼ E. distant 2½ miles. There is reported to be a mackerel fishery about this part of the coast on which 20 or 30 Spanish and Portuguese feluccas are employed during the fishing season.

Caution.—It is against the law of Morocco for any person to land on a part of the coast where there is not a port for their reception.

Coast.—From Arzila the coast continues in the general direction of S.W. ½ S., and presents nearly the same appearance, the depth at a distance of 3 miles from the shore being 25 to 30 fathoms, gravel. At 4 miles south of Arzila the coast hills rise to a height of about 700 feet. Haffat-el-Beida, or the White cliff, situated 8 miles south of Arzila, stands about 300 feet above the sea, and presenting in all directions the form of a wedge, serves to identify this part of the coast. The face or section of this cliff shows the strata lying at an angle of 70° with the horizon.

El Aráish * or Larache.—About 8 miles south-west of White cliff is situated El Aráish, on the steep southern point of the Wad el Khos (the bow), which here meanders through a fertile valley; the sudden bends in the river having probably suggested its Arabic name. A large castle on the summit of the hill, a lofty mosque, and several towers, give this town an imposing appearance when seen from seaward; this, however, soon vanishes on approaching it. The environs are laid out in gardens, from whence the town derives its name (El Aráish, signifying a pleasure garden), but they are in a very wild uncultivated state; in 1875 there was a population of about 5,000 persons at El Aráish.

Trade.—In 1875 the value of the exports from El Aráish amounted to 143,352*l*., and that of the imports to 28,925*l*.

Tides.—It is high water, full and change, at El Aráish at 1h. 30m.; springs rise from 9 to 12 feet.

On the bar at the entrance of Wad el Khos at low water there is a depth of 5 or 6 feet, deepening inside to 24 feet. The river takes an abrupt turn to the northward, and in the bend vessels moor.

Anchorage.—The best anchorage in the outer road of El Aráish for vessels intending to enter the river is about a mile off shore, in 12 fathoms, on a sandy bottom, with a distant conical mountain, named Jebel Sarsar, appearing in the centre of the entrance, bearing S.S.E.: or in 10 fathoms with the north entrance point bearing S.E. by E. ½ E. distant about 1¼ miles. The pap, or rising ground, on the north side of the river is 200 feet above the sea.

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* *See* plan:—El Aráish on Admiralty chart, No. 1,227; scale, *m* = 1 inch.

Old Mámorah.—About 21 miles southward of El Aráish is situated the outlet of a stream reported to flow from a small inland lake; on the north point of the entrance there are several tombs kept well whitewashed, the most prominent of which is named after Mulai-Abou-Sallūm. Though the coast is straight, there is tolerable anchorage off this river during the summer; at 2 cables from the bar of the river there is a depth of 5 fathoms, gradually increasing to 34 fathoms, at 2 miles off shore. The coast between El Aráish and Old Mámorah is generally about 300 feet high, with reddish cliffs for the northern 10 miles, and then sandhills partly covered with brushwood.

Rocky Shoal lies 15 miles southward of Old Mámorah, and one mile off shore; it has 8 fathoms on it, with 13 fathoms between it and the shore. From rocky shoal, Black rock bears E.S.E.

Mehediyah or New Mámorah lies 60 miles S.W. from El Aráish. The town stands on the lower slope of a hill which rises to the height of 456 feet, on the southern bank of the Wadi Sebou. It is celebrated for its ruins, the population is reported not to exceed 400, who subsist by the sale of a fish resembling salmon (shebbel), and who are not friendly to Europeans.

Anchorage.—There is good anchorage off Wadi Sebou during summer, there being 16 fathoms, muddy bottom, at a distance of 2 miles from the shore, but in winter S.W. and S.S.W. winds render it unsafe. Vessels approaching the land in the latitude of Mehediyah will strike soundings in 100 fathoms, coarse sand, when distant about 18 miles from the shore, and will shoal to 50 fathoms at a distance of about 8 miles from the coast.

Coast.—From Mehediyah the coast trends in a south-west direction, generally resembling that before described, but is rather more level, and wooded.

Sali.—At the distance of 17 miles south-west of Mehediyah the town of Slá, or Sali, stands on the northern bank, and near the mouth of the river Abú Rakrak. It is encompassed by a wall 35 feet high, strengthened and flanked by towers at regular distances.

Rabāt.*—The town of Rabāt extends along the opposite or southern bank of the river Abú Rakrak, and is larger than Sali. The population of both together is estimated at 30,000.

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* *See* plans:—Rabāt and Sali on Admiralty chart, No. 1,227; scale, *m* = 1 inch.

Rabāt is defended by fortifications which extend round the river and sea faces of the town.

Trade.—The value of the imports during the year 1875 amounted to 84,403*l.*, and that of the exports to 59,450*l.*

Hassan Tower.—This tower, situated south-eastward of the town of Rabāt, is 180 feet in height, and, standing on a cliff which rises 70 feet above the river, may be seen from a distance of 15 or 20 miles.

Tides.—It is high water, full and change, at Rabāt at 1h. 46m. (approximately) ; springs rise 9 to 12 feet.

Anchorage.—The best anchorage in Rabāt road is with Hassan tower just open of the south entrance point of the river, and 2 miles from the shore, in 21 fathoms mud, or a steam vessel in fine weather might anchor in 10 fathoms at 1¼ miles off shore, with Hassan tower in line with the east angle of the fort.

Bar.—A sand bank which dries at low water is situated at the mouth of Abú Rakrak river; of the two channels into which this bank divides the entrance the northernmost is the deeper. The southern channel has in it a depth of 2 feet at low water ; Hassan tower, in line with the east angle of the fort on the south entrance point, leads through this channel.

Landing.—There is always a heavy rolling swell on the bar, but with the aid of local pilots it may be crossed in two places with a depth of 5 feet at low water ; it is, however, very dangerous, as the banks constantly shift, and cause the loss of many coasting vessels. Landing is effected in lighters kept by the Government, ordinary boats being unfit for the purpose.

Fedālah cape.—The first conspicuous object, situated 7 miles W.S.W. from Rabāt, and built on the slope of a hill, is Massa tower, 190 feet high ; and 22 miles further in the same direction, the little town of Mansoriyeh will be seen, the principal mosque of which rises to a height of 180 feet. Five miles further west is situated the village of Fedālah, with a projecting cape to the westward of it, which when seen from a short distance has the appearance of an island, and affords some shelter to the small bay in front of the village. Vessels may anchor there in 5 or 6 fathoms, but very near the shore.

From Rabāt to cape Fedālah there is no danger at a distance of 3 cables from the shore, and the bank of soundings to the 100-fathom line is upwards of 20 miles in breadth and tolerably regular. At 22 miles N.W. of Rabāt there is a depth of 162 fathoms, whence towards the shore it suddenly shoals to 90 and 80 fathoms, between which depth and that of 60 fathoms the bottom for many miles is of fine sand and mud. The coast between Rabāt and cape Fedālah slightly recedes, but the inland features scarcely vary in appearance ; two lines of barren and gently undulating hills running nearly parallel to the coast. The distant hills are from 200 to 400 feet high, and lie 5 or 6 miles from the sea, while the coast range is not more than 200 feet in height, nor more than a mile from the beach, on which many patches of rock are intermixed with the sand, and down to which they gradually slope.

Banks.—N.E. by E. from Fedālah cape, distant 6 miles, there is a bank of 17 fathoms from which others extend about 9 miles in a W.S.W. direction parallel with the shore, and at a distance of about 3 to 4 miles from the coast. The least water on these banks is 15 fathoms, and there is deep water between them.

Dar el Beida cape bears W. ¾ S. distant 13 miles from Fedālah cape. Reefs extend from it to the distance of nearly half a mile, and further off, northward of the cape, there is a rocky bank of 6 fathoms; a safe distance at which to pass the cape is 3 miles.

Anchorage.—Northward and eastward of Dar el Beida cape the bottom is rocky in many parts of the bay between it and Fedālah cape; this must be a very unsafe anchorage during the winter, not only from its foul bottom, but from the current, which sets obliquely on the shore, rendering it difficult for a vessel when weighing to clear it with an on-shore wind. A good berth for a steam vessel is three quarters of a mile off shore in 10 fathoms sand, with the centre of the wall of the town of Dar el Beida bearing S.S.W., and the fort, on which is a white tower, bearing S.W. by W.; or in 6½ fathoms, hard sand, with British consulate flagstaff bearing S.W., and the extreme of the north-west fort bearing West.

Dar el Beida is also generally known by the name of Casa Blanca.

Landing.—A reef of rocks, which projects from the town, affords some shelter to a landing-place.

Trade.—In the year 1875 the value of the exports at Dar el Beida was 304,054*l.*, and of the imports 386,819*l.*

Coast.*—From Dar el Beida the coast runs nearly straight in a W. ¾ S. direction for a distance of 35 miles to Azamor point, the eastern two miles being rocky, but the rest a broad sandy beach, inside of which two parallel ranges of hills, of 300 and 400 feet in height, rise at the distance of 2 and 6 miles from the sea, and are partially covered with brushwood.

Azamor.—At Azamor point the coast suddenly bends southward to the mouth of the river Om-er-biyeh (mother of herbage), on the south bank of which, and 120 feet above the sea, stands the town of Azamor. The river has a bar of sand across its mouth, which dries nearly across at low water; though on the inside it is reported to be deep and rapid.

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* *See* Admiralty chart:—Africa, West coast, Sheet ii., Azamor to Santa Cruz, No. 1,228.

Mazighan cape.—The small town of Mazighan stands on a low rocky point, 8 miles westward of Azamor, the coast between forming an extensive bay. From cape Mazighan a reef extends more than a mile to the north-eastward, with shoal water beyond it. This reef somewhat shelters the anchorage for small craft in westerly winds, notwithstanding which a heavy swell rolls in.

A shoal, with 4 fathoms on it, gravel bottom, lies east from the north extreme of cape Mazighan distant 1⅓ miles from the shore; vessels should not attempt to pass between this shoal and the coast.

Directions.—Cape Mazighan should not be approached nearer than 2 miles. A small mosque, situated about 1½ miles eastward of the town, should be brought to bear S.W., until the ruined tower at Mazighan bears West; this latter mark then kept on, leads to a good anchorage in 7 fathoms, mud and sand, about one mile from the town.* Further eastward, in the eastern portion of the bay, the general depth is from 7 to 10 fathoms, fine dark sand, but this would be a wild and dangerous anchorage during winter.

The town or rather fortress of Mazighan is well situated for defence, being nearly at the extremity of the cape.

Landing may be easily effected after half flood in a camber on the east side of the town.

Trade.—The value of the exports during the year 1875 amounted to 260,410*l.*, and that of the imports to 154,228*l.*

Coast.—Between Mazighan and north cape Blanco, distant 11 miles in a W.S.W. direction, the coast should not be approached nearer than 1½ miles, as detached rocks lie off the shore, and the soundings are very uneven. The beach also, though in many places a broad sand, is generally fringed with rocks. A barren range of hills, 200 feet above the sea, slope to the beach throughout its extent, and terminate close northward of cape Blanco, in a low, dark, and rocky cliff.

At about 4 miles north-east of cape Blanco are situated the ruins of the ancient town of Tett, among which a tower 128 feet high and 148 feet above the sea is conspicuous from the offing.

NORTH CAPE BLANCO probably derives its name from a white cliff, 170 feet high, a little southward of the headland that forms the cape; it is named north cape Blanco, to distinguish it from the other cape of the same name situated in latitude 20° 47′ N.

Anchorage.—The bight on the south-west side of cape Blanco is reported to afford a temporary anchorage, but is only recommended for summer use.

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* Navigating lieutenant W. P. Haynes, H.M.S. *Aurora*, 1873.

Soundings. — At 19 miles N.W. by N. of north cape Blanco, a depth of 111 fathoms, gravel, will be found, and at 22 miles N.W. by W. from the cape there is 100 fathoms, broken shells, from whence it shoals gradually to the shore.

CAPE CANTIN.—From a position 3 miles north-west of north cape Blanco, to 3 miles north-west of cape Cantin, that rises precipitously 200 feet above the sea, the course is S.W. by W. ½ W., and distance 47 miles. Four miles southward of cape Blanco there is a dark cliff which projects from the shore, and which when seen from some directions has an insular appearance.

About 6 miles southward of north cape Blanco the hills rise gradually from the beach to the height of 450 feet, and appear to be the highest land on this part of the coast. About 10 miles south-west from the cape, near the coast, there is a black tower with some ruins near it; and 21 miles further to the south-westward, the ruins of El Waladiyeh may be seen on the shore, with a smaller group of ruins 2½ miles south-west of them. There is said to be here an extensive lake, communicating with the sea, but the boats of H.M.S. *Raven* during the Admiralty survey in 1835 did not discover the entrance; it was probably concealed by the high surf which breaks upon this forbidden shore. Four miles north-eastward of cape Cantin, the profile of the land, which is here about 450 feet above the sea, begins to lower gently, but close to the cape it again rises into a hummock, on the outer edge of which there is a white patch, seen both from the northward and southward, and apparently the site of a former town. A singular gap in the ridge of the cape is also seen when either north-east or south-west of it.

Current.—Northward of cape Blanco the current generally sets to the south-westward at the rate of about half a knot an hour; north-west of cape Cantin the current usually has the same direction, but a velocity of about 1½ knots an hour.*

Westerly swell.—Between cape Spartel and cape Cantin allowance should be made for a heavy swell that generally sets directly on the coast.

Soundings.—At 11 miles westward of cape Cantin, soundings may be obtained in 40 or 45 fathoms, sand and shells, decreasing irregularly to the cape, from which a reef or sandy spit extends to seaward for a distance of 1½ miles, with 5 fathoms on its extremity; at 3 miles W.N.W. from the cape the depth is only 17 fathoms.

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* In the offing north of cape Cantin a set of 1½ miles an hour to the south-eastward was experienced in November 1871.—Remark book of Navigating Sub-lieutenant E. S. Greaves, H.M.S. *Lee*.

Safi cape, the northern point of Safi bay, bears S.S.W. distant 12 miles from cape Cantin; the intermediate coast is a continuous line of white cliff with a broad sandy beach at its foot; the cliff gradually rising to 500 feet high at cape Safi, which may be known by a square tower, said to be the tomb of a celebrated Moorish saint.

Safi bay.—At cape Safi the land suddenly recedes to the south-eastward forming Safi bay, and the cliff drops into a ravine, the bed of a winter torrent. On the slope of the hill which rises from the south side of this ravine, stands the town of Safi, or more properly Asáfi, a place of considerable antiquity and importance, but which has only a population of about 6,000. Water is scarce, and during the summer it has to be procured from wells at a short distance southward of the town. The country in the neighbourhood appears from seaward to be sandy and barren, but travellers assert that it is remarkably fertile.

Trade.—During the year 1875 the value of the imports amounted to 36,761*l*., and that of the exports to 93,086*l*.

Anchorage.—Safi bay, during the summer months, affords as good anchorage and smoother water than any other on the coast of Marocco, but it is entirely exposed to westerly winds; the bottom is of sand and mud, and there is generally a depth of about 15 fathoms at a mile from the shore, shoaling gradually to 5 fathoms at a few yards from the rocks. Small steam vessels, if prepared to quit at short notice, may anchor off the town, with the citadel on the highest part of the town bearing E. by S., distant one quarter of a mile.

The landing at Safi is at all times bad.*

Wad Tensift. — Seven miles southward of Safi, a red cliff named Sharf-el-Judi, or Jews cliff, rises to a height of 280 feet above the sea. Ten miles further south-westward is the mouth of Wad Tensift, the principal river of Marocco; the general features of the coast throughout the space between Safi and Wad Tensift are high sandhills, sometimes terminating in low cliffs and occasionally in sloping points, backed by hills above 600 feet high, covered with brushwood; Wad Tensift, though a considerable river in the interior, had, in the month of August 1835, its bar entirely dry at low water. On the northern bank of the river there is a castellated building in ruins.

Coast.—From Wad Tensift the coast trends in a S.W. by W. ¼ W. direction for a distance of 9 miles to the tomb of Sidi Abd Allah; and further on, other tombs with the ruins of a town will be seen at the base of the Iron mountains. The coast, which from Wad Tensift is barren and uncultivated, and from 200 to 300 feet in height, here shows renewed signs of cultivation. Jebel Hadid, or the Iron mountains, a large mass of high land extending more than 20 miles in length, rises to the height of 2,300 feet; and on one of its summits the tomb of Sidi Wasman forms a very conspicuous object, useful in recognizing the land, and verifying the position of a vessel.

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* Captain S. Douglas, H.M.S. *Aurora*, 1873.

Hadid point.—At 43 miles S.W. ¼ W. from cape Safi is situated a sandy spit named Hadid point, which projects a mile beyond the general trend of the coast, terminating in a reef half a mile in length; at 1½ miles west of the point the depth is 8 fathoms.

Coast.—From Hadid point the sandy beach continues in a south-west direction for a distance of 12 miles to Mogador; the view inland being bounded by the high Botof sandhills, which extend parallel to the beach at about a mile inland.

Soundings.—At the distance of 6 and 7 miles from the coast, between Safi and Mogador, the depth is 25 and 20 fathoms, whence, except off Hadid point, it gradually decreases to the shore.

MOGADOR.*—When approaching the land on the parallel of Mogador, the first remarkable features which are seen are the distant craggy summits of mount Atlas, capped with snow, and contrasting with the dark ridges of intermediate hills; while to the northward, the Jebel Hadid, or Iron mountains, appear like a large island. On a nearer approach to the shore, a narrow white streak of sandhills, fringed at the top with verdure, seems to rise out of the sea; and at the distance of 8 or 10 miles the mosques and castles of Mogador begin to be distinctly seen, as well as the low black island which fronts it.

Soundings in 100 fathoms may be obtained at a distance of 22 miles from the shore, on the parallel of Mogador, eastward of which the water almost immediately becomes discoloured; from the depth of 78 fathoms the soundings decrease gradually, the 50-fathom line being about 8 miles from the shore.

Town.—Mogador, or Suïrah, dates only as far back as 1760, when the Sultan Mohammed Ben Abdallah, having been attracted there by the wreck of a European vessel, laid its foundations. Unlike those of any other town in his dominions, they were planned by a Genoese architect, with some little attention to convenience and regularity; and the effect was so pleasing that it received the name of Suïrah, or the Beauteous Picture, it is, however, better known to Europeans by its more ancient name of Mogador. The town stands on a low sandy spot, which is surrounded by the sea at high-water springs, and the adjacent ground is therefore a swamp.

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* *See* Admiralty plan:—Suïrah or Mogador harbour, No. 1594; scale, $m = 4$ inches.

Mogador is defended by a wall, with forts at the principal angles, and has a population of about 20,000.

Fresh water.—Formerly there was a great want of water, as the river is a mile and a half distant, but an aqueduct now conveys the stream to several large tanks built in different portions of the town. One of these has been placed very conveniently for the vessels in the harbour, as it lies close to a jetty inside the fortified bridge ; and boats may fill there towards high water, perfectly sheltered from all winds.

Supplies.—The market is excellent ; provisions of all sorts, including fish, poultry, and game, are abundant and cheap, as are also fruit and vegetables. The price of beef is regulated every day by a superintending officer. The port charges for merchant vessels are high, as well as those for ballast. Boat-hire is also expensive, owing to the number of boats that are every year destroyed by the surf.

Coals can be obtained in small quantities.

Trade.—In 1875 the value of the imports amounted to 209,940*l.*, and that of the exports to 253,986*l.*

Mogador island, about half a mile long and a quarter of a mile broad, lies half a mile from the opposite beach, and three quarters of a mile south-west of the town ; it rises about 94 feet above the sea, and except upon the eastern side is surrounded by extensive detached islets and reefs, which extend 3½ cables from its south-west extreme : the shores are cliffy and defended by several batteries.

A high islet, nearly joined to Mogador island, lies off its north-east extreme, and immediately north-east of this islet there is a rock above water.

Mogador harbour, or, as it is generally termed, Mogador bay, is formed by a double bight in the coast line ; the northern part of which is somewhat sheltered from the long Atlantic swell by Mogador island.

To enter.—The north entrance affords a clear channel, about 3 cables wide, with from 4 to 6 fathoms water in it ; but in the harbour the depth decreases to 3, 4, and at the most 5 fathoms, on a rocky bottom with only a superficial covering of sand, and the clear space for anchoring is contracted to little more than half a mile in length and the same in breadth by reefs extending from the town point, and by the 2 fathoms flat which extends from the shore to Mogador island.

Leading mark.—The sanctuary of Sidi Mogodol kept on a S.E. by S. bearing, leads safely in through the north entrance.

Anchorage.—The actual extent of the anchoring berths is of small dimensions ; vessels generally haul close in to the eastward of the middle of the island, and anchor at little more than half a cable from the shore, and therefore in only 14 or 15 feet at low water, loose sandy bottom. A more central position in the bay and in deeper water would be directly open to the swell of the Atlantic, which occasionally sets in with great violence, even in moderate weather. The greater facilities for discharging cargo induce merchant vessels to anchor in the eastern part of the harbour, well under the shelter of the rocks that extend off the town. With the prevalent north-east wind, this northern entrance is so distinct as to require no further directions than to keep in mid-channel.

South entrance.—The bight southward of Mogador island is never used as an anchorage, but vessels of not more than 12 feet draught find it more convenient to cross the flat between the island and mainland, and to run *out* in that direction with the benefit of the current, than to work out through the northern entrance. The lead will be a sufficient guide not to deviate much from midway between the island and the opposite shore, in passing through this south channel; or the great mosque of Mogador, standing near the beach, in line with a house with an angular roof (the only one in the town), leads across that flat in the deepest water.

This channel is said to be filling up.

Caution.—Vessels should moor in Mogador harbour, with a very short scope of cable and open hawse either to the northward or southward, according to the season of the year. From November to April this bay can scarcely be considered tenable, although it has often been asserted that vessels with good ground tackling need be under no apprehension. The nature of the bottom, however, shows that no reliance can be placed on the hold of the anchors; and the necessity of veering more cable to a westerly gale, will increase the exposure of the vessel to the effects of the swell which rolls round both extremes of the island, and which again reacts from the opposite shore.

Anchorage for steam vessels.—A good berth for small steam vessels is in 4½ fathoms, with the north-east extreme of Mogador island bearing W. ¼ N., and the ruined battery on the mainland south of Mogador island, bearing S.S.W.

Mogador road.—Vessels of more than 14 or 15 feet draught, would find it imprudent, unless in fine summer weather, to anchor in the harbour; and if intending to remain but a short time, fair anchorage can be obtained outside Mogador island, open indeed from S.W. round by North to N.E. b. E., and at all times exposed to a long swell, but comparatively safe during summer. A good berth is in 13 fathoms, fine dark sand, good holding ground, with the fort west of the custom house bearing S.E. by E., and the rocky points at either extreme of Mogador island bearing S. by E. ¾ E., and S.W. by S. This roadstead is three-quarters of a mile from the shore, and the pilots consider it the best outer anchorage, though the holding ground is loose.

Caution.—During the winter months, S.W. winds spring up with but slight warning, rendering anchorage in the road dangerous; and with the first sign of a falling barometer an offing should be sought.

Tides.—It is high water, full and change, in Mogador harbour at 1h. 18m.; springs rise 10 or 12 feet. The tides are generally regular in their rise and fall, but the direction of the tidal stream varies with the wind, and its strength is at all times weak.

Current.—The current in-shore at Mogador is reported sometimes to set to the northward; but farther seaward it always sets to the south-westward. In the offing between Mazighan and Mogador a set of 2 knots per hour to the S.S.E. has been experienced in November.

Winds and weather.—N.E. winds with fine weather prevail from March to December; during the remaining three months the winds are variable and the weather stormy.

East and S.E. winds are rare; they are locally known as the simoom, and are dry and hot.

Southerly winds are usually gentle, and accompanied by fog; these winds generally veer to N.W. before dying away.

Gales usually blow from W.S.W., and are preceded by a falling barometer.

The climate of Mogador is agreeable, the range of the thermometer being from 64° to 70° F.

Sim cape, or Ras Tegriwelt, lies 8 miles south-west of Mogador. It is a low sandy point, sloping gradually from a height of about 500 feet, and terminating in reefs of rocks which extend from the point to the distance of nearly a mile, and should not be approached within 2 miles. The intermediate coast between this and Mogador is a continuous line of bare sandhills, 70 feet high, sloping to the beach. The Botof sandhills north-east of Mogador, and covered with a dark evergreen cap, are visible from the offing.

Wad Tidsi.—Seven miles southward of cape Sim the Wad Tidsi issues through a picturesque ravine; and not far from thence is situated the village of Koleï'at. From Wad Tidsi to cape Tefelneh bold cliffs, apparently of sandstone, rise from the shore, and at 7 or 8 miles in the interior there is a range of hills between 2,000 and 3,000 feet above the sea.

Tefelneh cape lies 18 miles S. by W. ¾ W. from cape Sim; it rises to 700 feet in height, and terminates in a point, from which a ledge of rocks extends half a mile, with deep water close outside them.

Soundings.—At 6 miles west of cape Tefelneh the depth is 40 fathoms, whence it shoals gradually to the shore, except to the northward, where a reef extends some distance from the cape, and where the water should not be shoaled to less than 20 fathoms.

Anchorage.—There is reported to be anchorage ground in 10 fathoms, sand, under the south side of cape Tefelneh, with shelter from East and N.E. winds.

Ghir cape, or Ras Aferni, projects boldly into the sea at 29 miles S.S.W. ¼ W. from cape Tefelneh ; the hills inland of the intermediate coast rising to the height of nearly 3,000 feet, and the country appearing, from its numerous villages, to be well inhabited, with several conspicuous tombs and scattered woods. The cape shows a bold bluff face, but slopes gradually on each side from the summit, which is about 1,200 feet high.

Santa Cruz.*—The town of Agadir, or Santa Cruz, which is the most southern part of Marocco on the Atlantic ocean, stands on the summit of a hill about 600 feet above the sea, bearing S.S.E. ¾ E. distant 18 miles from cape Ghir ; the deep bay which intervenes offers a convenient anchorage during the prevalence of north-easterly winds. The beach is rocky from the cape to Wad Tarmarakt, which enters the sea through a fertile valley, about 13 miles northward of Agadir. The hilly region which backs this part of the coast, and known as the Heights of Idantenan, is the western extremity of the chain of mount Atlas, and rises at 9 miles north of Agadir to the height of 4,400 feet.

Immediately south of Santa Cruz is situated the small fishing village of Fonti, where there is a boat harbour.

Anchorage.—The bay of Agadir affords good shelter from north-easterly winds, but is exposed to those from the westward ; the depth of water is moderate. Convenient anchorage will be found with the castle bearing N.N.E., in 7 or 8 fathoms water, and about a mile off-shore This is one of the best roadsteads for shipping along the coast of Marocco.

Supplies.—The bay is well stocked with fish, large quantities of which are caught, dried, and sent to Mogador and to the interior ; this is the only trade which is pursued at Santa Cruz. Provisions are good and plentiful, and water easily procured.

Tides.—It is high water, full and change, at Santa Cruz at 0h. 45m. ; springs rise about 9 feet.

Current.—The southerly current which prevails along the cost of Marocco is not felt when abreast of Agadir till at the distance of 6 or 7 miles from the land, being deflected by the projection of cape Ghir.

Coast.—Immediately southward of Santa Cruz a very low and flat country commences, and extends for 28 miles in a southerly direction.

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* *See* Admiralty chart :—Africa, West coast, Sheet iii., Santa Cruz to cape Bojador, No. 1,229.

Sous river.—This river, which rises at the foot of mount Atlas, discharges into the sea at miles southward of Agadir. A bar of sand extends across the entrance, which is nearly dry at low water, and cannot at high water be entered by a vessel drawing more than 4 or 5 feet.

Seven Springs.—From the river Sous the same description of sandy coast continues to the southward; at the distance of 7 miles are the Souwaniyeh, or wells of fresh water, also known as Tomieh, or the Seven springs. The anchorage off this place differs in no respect from that which can be found off almost every part of this coast.

Soundings.—At the distance of 17 miles west of Souwaniyeh there is a depth of 86 fathoms, dark sand; at 6 miles, 40 fathoms, sand and mud, decreasing gradually to the beach.

Wad Mesa.—At the distance of 12 miles south-west of Souwaniyeh there is a little river, Wad Mesa, with a bar of sand across its entrance which dries at low water; it is said to have been formerly navigated by the Portuguese, and occasionally the depth both of the Sous and Mesa, is said to be 2 feet at low water.* At a short distance within the bar, on the northern bank, there is a village; and to the southward, near the beach, an ancient castellated building.

Aguláh cape, in lat. 29° 49′ N., is only a slight projection of the coast line: a decided change, however, in the appearance of the coast begins at this point, for though the beach with a heavy surf breaking on it continues as to the northward, its bare appearance is now superseded by a series of green hills, which, as they approach the sea, form cliffs of sandstone, about 100 feet in height. At a considerable distance inland there is a range of mountains, about 2,000 feet high, and much of the neighbouring country appears to be wooded, cultivated, and well inhabited. The houses, which are built of dark red brick or clay, are numerous, and some are large and surrounded by farm buildings. The village of Aguláh stands on a hill, about a mile from the beach of a small sandy bay, into which the Wad Assa falls.

Coast.—Twelve miles south-west of Aguláh the features of the country again alter; the hills resume their abrupt and barren appearance, and form successive ridges, gradually increasing in height till they join the line of distant mountains, which, as well as could be estimated, attain the height of nearly 4,000 feet, and appear to be the south-western extremity of one of the offsets of the Atlas range. Still further to the south-westward these bare hills and the broad sandy beach give place to dark red cliffs, broken into little bays and coves, in some of which, boats (the first seen southward of Santa Cruz) were hauled up. From the number of villages this part of the coast seems to be populous.

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* Mr. J. W. Elton, H.B.M. Vice consul at Mogador.

The principal settlements appear to be at Sidi-bou-Nouar, situated 5 miles south of cape Aguláh; at Sidi-bou-Sadail 9 miles farther south; at Garizim, the mouth of a small river situated 20 miles south of Aguláh; and at Salmagat, where there are some small wells situated a little north of Wad Gueder.

At Wad Ifni, situated 27 miles south of cape Aguláh, a small white tomb near the shore is conspicuous. Near this tomb, at a height of 300 feet above the sea, is situated the village of Idufker.

Wad Ifni, which is dry during the summer season, affords a landing place in fine weather.

At 4½ and 6½ miles south of Wad Ifni are situated two mountain torrents, known as Tazerut and Wad Queraima, with a few houses near them.

Jorba or Sok Ensara is the name of a deep ravine where there are the ruins of an ancient mole; it lies in lat. 29° 14′ N.*

Sugar-Loaf mountain.—In lat. 29° 22′ N. there is a remarkable white cliff, the singularly curved and irregular strata of which, with a solitary conical mountain inland, shaped like a sugar-loaf, form good marks for recognising this part of the coast.

Soundings.—North-west of the white cliff, at a distance of 20 miles from the shore, there is a depth of 100 fathoms, broken shells, outside of which the bank drops very suddenly; nearer the shore the depths decrease rapidly to 60 fathoms. At 5 miles from the coast there are from 28 to 24 fathoms, coarse sand; and from thence the depth decreases more gradually to the beach.

Wad Gueder.—In lat. 29° 10′ N. a little bay, named Wad Gueder, lies between two steep rocky points; the water in it is deep, and the bottom clean up to the beach; and though it affords no shelter for large vessels, yet landing may generally be effected there in the fine season.

The northern entrance point has on it a conspicuous white mark, and a small conical hill is situated on the right bank of the river close to the shore; further inland on the same parallel there is an isolated peak 2,970 feet high.

Playa Blanca river.—In lat. 29° N. the mountainous country terminates, and a sandy desert commences. There is also a break there in the coast, which presents the appearance of the dry bed of a river: it is named by the Canary fishermen Rio de Playa Blanca, and is situated 100 miles S.W. ½ W. from Santa Cruz. Playa Blanca river (also known as Wad Bueda, Wad Aureora, or Arrakont) is marked by an isolated conical hill and by a chain of mountains extending to the southward, known as the Table of Cape Noun.

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* Annales Hydrographiques, 1878, containing extracts from the report of a Spanish expedition in the *Blasco de Garay*, 1878.

Sous river.—This river, which rises at the foot of mount Atlas, discharges into the sea at miles southward of Agadir. A bar of sand extends across the entrance, which is nearly dry at low water, and cannot at high water be entered by a vessel drawing more than 4 or 5 feet.

Seven Springs.—From the river Sous the same description of sandy coast continues to the southward ; at the distance of 7 miles are the Souwaniyeh, or wells of fresh water, also known as Tomieh, or the Seven springs. The anchorage off this place differs in no respect from that which can be found off almost every part of this coast.

Soundings.—At the distance of 17 miles west of Souwaniyeh there is a depth of 86 fathoms, dark sand ; at 6 miles, 40 fathoms, sand and mud, decreasing gradually to the beach.

Wad Mesa.—At the distance of 12 miles south-west of Souwaniyeh there is a little river, Wad Mesa, with a bar of sand across its entrance which dries at low water ; it is said to have been formerly navigated by the Portuguese, and occasionally the depth both of the Sous and Mesa, is said to be 2 feet at low water.* At a short distance within the bar, on the northern bank, there is a village ; and to the southward, near the beach, an ancient castellated building.

Aguláh cape, in lat. 29° 49′ N., is only a slight projection of the coast line : a decided change, however, in the appearance of the coast begins at this point, for though the beach with a heavy surf breaking on it continues as to the northward, its bare appearance is now superseded by a series of green hills, which, as they approach the sea, form cliffs of sandstone, about 100 feet in height. At a considerable distance inland there is a range of mountains, about 2,000 feet high, and much of the neighbouring country appears to be wooded, cultivated, and well inhabited. The houses, which are built of dark red brick or clay, are numerous, and some are large and surrounded by farm buildings. The village of Aguláh stands on a hill, about a mile from the beach of a small sandy bay, into which the Wad Assa falls.

Coast.—Twelve miles south-west of Aguláh the features of the country again alter ; the hills resume their abrupt and barren appearance, and form successive ridges, gradually increasing in height till they join the line of distant mountains, which, as well as could be estimated, attain the height of nearly 4,000 feet, and appear to be the south-western extremity of one of the offsets of the Atlas range. Still further to the south-westward these bare hills and the broad sandy beach give place to dark red cliffs, broken into little bays and coves, in some of which, boats (the first seen southward of Santa Cruz) were hauled up. From the number of villages this part of the coast seems to be populous.

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* Mr. J. W. Elton, H.B.M. Vice consul at Mogador.

The principal settlements appear to be at Sidi-bou-Nouar, situated 5 miles south of cape Aguláh; at Sidi-bou-Sadail 9 miles farther south; at Garizim, the mouth of a small river situated 20 miles south of Aguláh; and at Salmagat, where there are some small wells situated a little north of Wad Gueder.

At Wad Ifni, situated 27 miles south of cape Aguláh, a small white tomb near the shore is conspicuous. Near this tomb, at a height of 300 feet above the sea, is situated the village of Idufker.

Wad Ifni, which is dry during the summer season, affords a landing place in fine weather.

At 4½ and 6½ miles south of Wad Ifni are situated two mountain torrents, known as Tazerut and Wad Queraima, with a few houses near them.

Jorba or Sok Ensara is the name of a deep ravine where there are the ruins of an ancient mole; it lies in lat. 29° 14′ N.*

Sugar-Loaf mountain.—In lat. 29° 22′ N. there is a remarkable white cliff, the singularly curved and irregular strata of which, with a solitary conical mountain inland, shaped like a sugar-loaf, form good marks for recognising this part of the coast.

Soundings.—North-west of the white cliff, at a distance of 20 miles from the shore, there is a depth of 100 fathoms, broken shells, outside of which the bank drops very suddenly; nearer the shore the depths decrease rapidly to 60 fathoms. At 5 miles from the coast there are from 28 to 24 fathoms, coarse sand; and from thence the depth decreases more gradually to the beach.

Wad Gueder.—In lat. 29° 10′ N. a little bay, named Wad Gueder, lies between two steep rocky points; the water in it is deep, and the bottom clean up to the beach; and though it affords no shelter for large vessels, yet landing may generally be effected there in the fine season.

The northern entrance point has on it a conspicuous white mark, and a small conical hill is situated on the right bank of the river close to the shore; further inland on the same parallel there is an isolated peak 2,970 feet high.

Playa Blanca river.—In lat. 29° N. the mountainous country terminates, and a sandy desert commences. There is also a break there in the coast, which presents the appearance of the dry bed of a river: it is named by the Canary fishermen Rio de Playa Blanca, and is situated 100 miles S.W. ½ W. from Santa Cruz. Playa Blanca river (also known as Wad Bueda, Wad Aureora, or Arrakont) is marked by an isolated conical hill and by a chain of mountains extending to the southward, known as the Table of Cape Noun.

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* Annales Hydrographiques, 1878, containing extracts from the report of a Spanish expedition in the *Blasco de Garay*, 1878.

A small stream, known as Bousifen river, enters the sea close north of Playa Blanca river.

Coast.—The coast from hence trends W. $\frac{3}{4}$ S. for 29 miles to cape Noun, the western portion being formed by bold sandstone cliffs, with sandy downs in the interior, but is entirely devoid of herbage.

The tract of country between Agadir and cape Noun offers great encouragement to commercial enterprise, and secure establishments might be maintained, which would amply remunerate an enterprising speculator. The inhabitants near the river Sous are well disposed towards Europeans; and the short distance of this river from the provinces, where most of the valuable products of Barbary are raised, would facilitate a profitable trade. The province of Sous is described as being peculiarly fertile and populous, and the inhabitants are less bigoted, and more friendly towards Christians than the Moors generally are. The real obstacle which opposes itself to opening a trade with this port of Marocco is the absence of secure harbours, or, indeed, of any tranquil anchorage.

Cape Noun or Los Morretes, in lat. 28° 45′ N., presents a steep face of sandstone about 170 feet high; but as the cliffs for some distance on each side of it are nearly of the same elevation, and the country inland an uninterrupted sandy desert, it is difficult to distinguish the exact projection till very near it.

Soundings.—The water is deep close to the shore, there are no off-lying dangers, and the depth gradually increases from the extreme of the cape to the distance of 4 miles, where there are 30 fathoms, reddish sand; at 12 miles, 50 fathoms, dark sand; at 20 miles, 57 fathoms; and at the distance of 30 miles from the coast, 85 fathoms, coarse red sand and shell: further out the water deepens suddenly.

Discoloured water.—For some distance, both north and south of cape Noun, as well as to seaward, the water has a red tinge, with a thick muddy appearance, so that the track of a vessel is visible for some time. This discolouration of the water may have alarmed navigators with the apprehension of shoals, and may account for the alleged existence of a bank off the cape; but it is evidently occasioned by the immense volume of very fine sand which is blown off the desert, and with which everything on board soon becomes coated, even when many miles from the shore. The water also of the river Noun, and of other streams which here discharge, and which are also all laden with this sand or dust, project it a long distance out to sea, till it is met by the current and dispersed.

Noun or Draa river, which falls into the sea 5 miles south-west of cape Noun, has been given a variety of names by different authors and travellers, Wad Noun by Borda, Assaka or Akassa by Jackson, Schleema by Wilshire, and the Solyman by Davidson; that of the Noun has been retained from its proximity to the cape of that name.

Wad Noun.—About 30 miles south-west of Noun river, and in lat. 28° 19′ N., there is another river of about the same magnitude, to which the name of Wad Noun has been equally often applied, and probably correctly, as the town of Wed-noun, or Wad Noun, is said to stand on its banks. Singularly enough the features of the coast adjacent to the mouth of each river are very similar, so that their latitudes become the best guides to distinguish them that can as yet be given. In the southernmost, or the Wad Noun, there appeared to be water enough for large boats, which it is said trade there from the island of Lanzarote, but the surf prevented any attempt to cross the bar in order to examine the interior.

The southern Wad Noun is also known is Wad Chibikah or Chipka.

The northern Noun, or Assaka river, when well open, may be recognized by two hills, which will then appear in the centre of the gap; they are both conical, and on one of them, which is about 300 feet high, there are some ruins, said to be those of a Spanish fortress. When approaching the southern river, or Wad Noun, the table-land breaks into detached hills, which will help to identify it: the highest of these hills rises about 900 feet above the sea.

At 12 miles south-west of cape Noun is the mouth of a torrent known as Ouina Seguira, and at 21 miles from that cape a reef of rocks, partly uncovered at low water, forms a boat harbour, locally known as Meano or Uina, about half a mile long and 2 cables wide, with depths in it of 3 fathoms in some places.

This harbour can be entered by boats, either through a channel among the reefs, or between the south extreme of the breakers and the mainland.

At 2 miles south of this harbour is situated the torrent of Sebba Jarsa.

Anchorage.—The coast between the Noun rivers is formed by sandstone cliffs, above which the table-land just shows, when seen at the distance of 3 miles from the shore ; there is a regular depth of 20 fathoms and good anchorage ground at that distance, which anchorage, however, is not safe before March nor after October.

Commerce.—If any attempt should ever be made to open a direct trade with this part of Marocco, either of these rivers would offer an eligible situation for a factory, as there appears to be sufficient evidence that inside the bars there is ample room and depth for vessels of some burthen ; that favorable opportunities for crossing the bars are frequent ; and that the rivers are navigable for large boats for a considerable distance up the country.

Fisheries.—A fishery, which is prosecuted by the inhabitants of the Canary islands, commences at cape Noun ; the fishermen seldom venturing further to the northward, though fish are there equally abundant, from their dread of the Moors, who on that part of the coast possess boats. But from cape Noun to the bank of Arguin, which is the southern limit of the fishery, a distance of about 600 miles, the inhabitants are unprovided with boats; and the fishermen, therefore not only fish on the bank close in-shore, but frequently land, as well to barter their fish for orchilla and the fine Barbary wool, as to procure water, but always with the greatest circumspection.

Coast.—From the southern Wad Noun the coast and inland features of the country continue the same in a westerly direction for a distance of 30 miles, to a headland known as El Morro, the cliffs being about 120 feet in height; but there they terminate, and a low sandy beach surmounted by sandhills, of which the northernmost is the highest, extends for the distance of 11 miles to Porto Cansado.

The southernmost of these hills, named Gord-el-Jamar, is conpicuous, being composed of red sand.

Porto Cansado.—The entrance to this inlet appeared to be very narrow, but apparently it widens inside, and forms a sort of lagoon. The sea broke heavily across, and it is barely possible that boats may at times be able to enter. A table hill, 400 feet high, between Porto Cansado and the back land, is its only distinguishing mark. Nothing can be more dismal than the appearance of the shore hereabouts; for many miles there is not a dark spot to be seen to break the monotonous appearance of the sand, the fine particles of which mingling with the haze occasioned by the heavy surf, render the coast very indistinct.

Coast.—Cape Juby bears W. ⅔ S. distant 108 miles from cape Noun, the coast between receding about 12 miles, Wad Noun being the point where the indentation is deepest.

At a short distance westward of Porto Cansado, cliffs, from 90 to 100 feet in height, again commence and continue for several miles; they consist of dark sandstone, and the bottom is also of dark sand, which gives a dark greenish appearance to the water. Inland, a flat desert extends as far as can be seen, but there is no beach, the sea breaking against the cliffs, on which it appears to be gradually encroaching. Where the cliffs terminate, the country becomes broken into sandhills, partly covered with bushes, and the coast trends in the direction of W. ¾ N. for a distance of 15 miles to cape Juby, which is 36 miles from Porto Cansado.

Current.—From Wad Noun the coast curves outward, and the current, which hitherto has nearly followed the direction of the shore, here strikes it obliquely, rendering this the most dangerous part of the coast between capes Spartel and Bojador, and fully accounting for the numerous wrecks which have occurred there, the timber from which is used by the inhabitants both for firewood and materials for building their huts.

The swell too is almost invariably from the north-west, and therefore sets directly into the bight, so that it is almost impossible for a sailing vessel embayed there to work off.

Cape Juby is a low sandy point, terminating in a hummock covered with bushes, and having when seen from all directions the appearance of an island. There are some rocks which project from the cape to the distance of a third of a mile in a south-westerly direction, with 10 fathoms water close to them.

Tides.—Spring tides at cape Juby rise about 8 feet.

Coast.—From cape Juby the coast turns to the south-west, forming little bays, off the points of which are some detached rocks, though the general coast line is a sandy beach, with the exception of three small patches of cliff. At the distance of 4 or 5 miles inland there is a long range of broken sandhills, not exceeding 250 feet in height, named Los Matillos. In lat. 26° 46′ N. the sandy shore terminates, and a series of cliffs commences, extending S.W. for 11 miles and then W. ½ S. for 30 miles, or to within 3 miles of the False cape of Bojador.

At about 17 miles south of cape Juby is situated the mouth of Seguia Elkhamra river; many of the streams on this coast are dry, except during the rainy season.

False cape of Bojador.—This cape is low and sandy, with a reef of rocks extending from it about 1½ miles to the northward.

Westward of False cape the coast forms a bight 16 miles across, the western point of which is fringed by rocks, and from which the coast trends in a direct line S.W. by W. ½ W. for a distance of 10 miles to cape Bojador.

Seven fathom bank.—A bank, with 7½ fathoms on it and 17 fathoms between it and shore, lies N.W. ½ W. distant 6 miles from False cape; this suspicious shoal has not yet been traced to its limits, nor this portion of the main bank closely examined.

Currents.—It may be assumed that the surface water between cape St. Vincent (in Portugal) and the neighbourhood of Rabât (on the coast of Africa) is in motion at the rate of 10 or 20 miles per day towards the strait of Gibraltar, thus causing a general current to the eastward. On the coast of Spain the stream runs to the south-eastward; on the coast of Africa it has a tendency to the north-eastward.

Between Mogador and cape Bojador the current between the shore and a position about 50 miles seaward of it, runs in the direction of the coast, to the southward and westward, so that its course may be safely inferred from the bends of the shore. Its greatest strength is usually found at the distance of from 3 to 6 miles from the land, gradually decreasing both inwards and outwards; its average rate within that belt is from half to three quarters of a knot an hour, as far as cape Juby. Off that point, owing to the conformation of the coast, and from being compressed by the Canary islands, its velocity somewhat increases. Off cape Cantin it sometimes attains a velocity of 1½ knots an hour. Off cape Bojador it flows at less than a knot an hour, and as far as could be observed it pursues its steady course uninfluenced by any change in the direction of the wind.

Winds and weather.—On the coast of Marocco during the winter months the prevailing winds are from North and N.N.E.; winds from the westward occasionally blow with considerable force, and are frequently accompanied by thick and long continued fog.*

During summer the prevailing winds are from N.N.W. through North to E.N.E., and blow generally freshly: between the Canary islands and the mainland N.N.W. winds are stronger than elsewhere.

Between November and March landing on the coast can only be effected with difficulty on account of the heavy surf, but during the summer months and also when the land wind is strong, it is almost everywhere accessible.

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* On that part of the coast between cape Ghir and cape Juby, light northerly winds prevailed during the month of January.—*Annales Hydrographiques*, 1878.

CHAPTER III.

MADEIRA GROUP AND SALVAGE ISLANDS.

VARIATION in 1880.

Funchal bay	20° 45′ W.	Salvage islands	20° 00′ W.

THE MADEIRA GROUP,* consisting of the islands of Madeira, Porto Santo, and the Dezertas, is situated in the North Atlantic ocean, at 340 miles from the coast of Marocco, between the parallels of 32° 23′ and 33° 08′ north latitude, and the meridians of 16° 16′ and 17° 17′ west longitude.

Population.—In 1876, the total population of Madeira and Porto Santo islands amounted to 123,841.

MADEIRA ISLAND, the largest and most important of the group, is situated between the parallels of 32° 37′ N. and 32° 52′ N., and the meridians of 16° 39′ and 17° 17′ W. The island is 32 miles long in a north-westerly direction from San Lourenzo point to Pargo point; its extreme breadth from Cruz point on the south, to San Jorge point on the north, is 13 miles, and the circuit of the island is about 80 miles. Funchal, its capital and seaport, is situated on the south side of the island.

The characteristic features of Madeira are, its great and general elevation, the number and picturesque outline of its mountains, the depth and grandeur of the ravines, the numerous mountain streams, abundance and purity of water, fertility of soil, extreme mildness and uniformity of temperature, and the excellence of its climate.

Discovery.—Madeira is said to have been discovered in 1334 by an Englishman named Machim, who was wrecked on its shores, but more probably it was first seen by Portuguese navigators in 1419. At that time the island was uninhabited and covered with timber, from which latter circumstance it received the name of Madeira. The island was settled by the Portuguese in 1421, and has since continued in their possession, except during the continental war which terminated in 1814, when it was occupied by the English, and restored to Portugal at the peace of 1814.

The Government of Madeira is administered by a lieutenant-governor, who has almost absolute power.

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* *See* Admiralty chart :—Islands of Madeira, No. 1,831

Formation.—Although of volcanic origin, there are no craters to be seen on any part of it except San Antonio, a mountain 1¾ miles west of Machico bay, on the south-east side of the island, which has a smooth shallow basin on its summit.

Pico Ruivo is the most elevated of the peaks which occupy the interior of the island, being 6,056 feet above the sea, and covered with vegetation. It has a well-defined but rather rounded summit, and stands on the north edge of the stupendous ravine of the Curral. With reference to the coast, it lies nearly 7¾ miles north of Cruz point, and not quite 5 miles S.S.W. from San Jorge point. The mountain has a continuous slope towards the sea, in a north and north-east direction; on the south-west side it drops abruptly into the Curral.

Boat harbours.—No part of Madeira affords a sheltered harbour, and the word "ports," attached to several places on the Admiralty chart, must be regarded as the designation given by the islanders to those little coves, or landing-places, where they haul up their fishing boats, and those vessels of larger construction employed in the transfer of wine to Funchal, or on other coasting business of the island.

Coast.—It may be stated generally that the south coast has a gradual slope from the mountains in the interior to the sea, and that the north and west coasts, on the contrary, are, with few exceptions, high and bold, and descend precipitously.

Cultivation.—The cultivation of the island on its south side seldom extends more than from 2 to 2½ miles inland, and on its north side not to half that distance; but little cultivation is attempted at elevations exceeding 3,000 feet. The whole of the mountains above that height, which constitute so large a portion of the island, are left wild and uninhabited.

Climate.—The temperature is always moderate, and has a very small range. The following are the mean monthly temperatures deduced from observations extending over several years:—

January	64°	Fahr.	July	72°	Fahr.
February	63°	„	August	74°	„
March	64°	„	September	74°	„
April	64°	„	October	71°	„
May	65°	„	November	68°	„
June	69°	„	December	64°	„

a very low temperature being 53° Fahr. It is this equality of climate which constitutes the chief recommendation of Madeira to invalids, but the voyage from England should not be attempted by them before the middle of June, or later than the end of September. Spring is trying on account of the prevalent N.E. wind, and October is the first month of the rainy season of autumn.

WINDS.—January is sometimes a very boisterous month, with S.W. winds; more generally N.E. winds prevail. Rain is frequently experienced on the north side of the island, while in Funchal bay it is fine and clear.

During February there is also sometimes a prevalence of southerly winds, but more frequently northerly, shifting at times suddenly to East and E.S.E., so that no dependence can be placed upon them. These sudden shifts of wind are frequently followed by gales of short duration, accompanied by thunder and heavy rain.

In March the prevalent winds are from N.W., and occasionally blow very hard, though they are not dangerous to vessels at anchor in Funchal bay, but they occasion a high surf on the beach, which renders the transfer of goods very difficult. Sometimes in this month there are heavy falls of snow on the mountains.

During April the weather is unsettled, occasionally strong winds continue until the middle of the month, though it is more usually fine from its commencement; the mountains are occasionally capped with snow in April.

May, June, and July have generally clear nights and cloudy days, with regular land and sea breezes near the land and steady N.E. winds in the offing.

August and part of September are fine though hot months, L'Este or Siroc winds are occasionally experienced, these winds blow from the East sometimes in considerable strength for 6 to 9 days consecutively, accompanied by a dry and cloudless atmosphere.

Rainy Season.—In October, towards the middle of the month, the periodical rains may be expected, which continue generally about fourteen days. They frequently commence with strong S.E. winds, which veer to S.W. and round to N.W., when the weather clears and becomes fine. St. Martin's summer succeeds this rainy season, and extends usually over an equal period of time, being accompanied by N.E. winds. There is, however, much irregularity about St. Martin's summer, for it is sometimes delayed until December.

In November and December fine weather is generally experienced, the prevailing wind being from N.E., with occasionally thick weather.

Gales are principally to be apprehended in November and December, commencing a few points on either side of South, gradually veering round to the westward, and terminating at N.W.

Population.—The population of Madeira in 1876 was 122,080. The inhabitants are of a mixed race, principally Portuguese and Moors.

Commerce.—The principal articles of export are wine, honey, wax, tobacco, &c. In 1875, the total value of exports was 198,840*l*; that of the imports being estimated at 275,249*l*.

Shipping.—During the year 1875, the number of vessels that entered Funchal was 419 British, with an aggregate tonnage of 355,098; and 182 foreign, with an aggregate tonnage of 77,066.

Productions.—Below the elevation of 1,200 feet many of the most useful tropical plants, as the date, palm, guava, banana, and coffee plant are found, with numerous others peculiar to the warmer part of the temperate zone.

From the level of the sea to an elevation of 2,500 feet the fruits and grains of Europe, especially maize and corn, are raised, and nearly the whole of this district is covered with vineyards: the chesnut, which is extremely abundant, the beech, and other European trees, with the mahogany, grow on the mountains below the elevation of 3,400 feet, above which only pines, heaths, ferns, and grasses are found.

Fish are found in variety and abundance, the best being tunnies and eels.

Agriculture is chiefly confined to the growth of the vine, the land being usually let in small holdings of 10 to 40 or 50 acres. Wheat, barley, maize, and rye are produced, but the crops produce on an average only about one third of the consumption.

Fruits and vegetables grow with little trouble, and in great abundance and variety.

Wine is the most noted article of Madeira produce. The grape is not indigenous to the island, and it is said to have received its plants from Crete, being carried from that island by order of the famous Prince Henry of Portugal, under whose auspices Madeira was settled by the Portuguese in 1421. Many other varieties of the grape have since been carried to the island, its mild climate and volcanic soil being especially suitable for their growth.

The north side of the island, though sufficiently fertile, being so exposed to cold winds and fogs, is not so favourable to the culture of the vine as the south side, where all the finest growths are raised.

In 1875 the estimated quantity of wine produced in Madeira was 8,000 pipes.

FORA ISLET.—The first part of the Coast of Madeira seen when approaching from the eastward is Fora islet, lying close to San Lourenzo point, the eastern extremity of the island. This islet is 800 yards long from N.E. to S.W., and a little more than 200 yards in breadth, it is surrounded by rocky cliffs except at its south-east side, where it slopes to the sea and offers the easiest landing. On the west side is a little rocky cove. A rock, shaped like a sugar-loaf, marks its south extremity, and three or four low rocks lie close to its south-east shore, nearly midway between its extreme points. The surface of the islet is of very uneven outline, and covered with a light stony soil and sand. Near the north extreme there is a peak, 352 feet above the sea.

Fora islet is separated from San Lourenzo point by a channel 200 yards wide, the depth in it at low water being from 3 to 4 fathoms, rocky bottom; a swell or strong breeze with opposing tide causes so great a turmoil in this channel, that it is frequently unsafe for boats to pass through.

Fora islet is steep-to in all directions, except its south-east side, off which are dangerous rocky shoals surrounded by deep water. The outer danger, which lies S.E. nearly 4 cables from the islet peak, is a small shoal with 4 fathoms on it and 13 and 26 fathoms close to. The inner danger is more extensive, bearing from the peak S.E. by S. distant 3 cables, and upon this are several rocks, some with 15, others with only 4 feet over them.

LIGHT.—The white lighthouse, 41 feet high, attached to the keeper's dwelling (also white) on Fora islet, is 343 feet above the sea; it exhibits a *fixed* white light, varied by a *flash* every *half minute*, and visible in clear weather for a distance of 25 miles.

Caution.—The distance of the shoals off Fora islet from the shore is so inconsiderable that sailing vessels would scarcely venture near them; but steam vessels should be cautious not to round the islet too closely.

Coast.—From Fora islet the extreme land seen to the south-westward is the low point of Oliveira, bearing W. by S., distant 10½ miles; but the bold head of cape Garajao, or Brazen head, being much higher than Oliveira point, and bearing from it W. ¼ N. distant one mile, is seen over it.

Soundings.—The bank of soundings to the 100-fathom line extends further off the land between S. Jorge point and S. Lourenzo point than off any other part of the island, except Pargo point, and the depths over it are tolerably regular, except in front of P. da Cruz. North-eastward of S. Jorge point the 100-fathom line lies about 1½ miles from the shore. North-eastward from P. da Cruz the bank extends 3 miles. N.E. by N. from Castello point the 100-fathom line is 2½ miles from the shore, with 45 fathoms at a distance of one mile.

From Fora islet the bank of soundings to the 100-fathom line extend to the N.E. 3 miles; to the E.N.E. 3¼ miles; to the E.S.E. 4 miles; in the direction of S. by E., to the Dezertas; and in a S.S.W. direction one mile. The quality of the bottom generally is dark gray sand, and coral, while near the shore it is rocky.

On an E.N.E. bearing from Fora islet, there is a depth of 30 fathoms close to the shore; at a distance of half a mile from the coast, 38 fathoms; at one mile, 50 fathoms; at two miles, 65; at three miles, 85; and at three and a half miles, 150 fathoms.

On the parallel of Fora islet, at a quarter of a mile distant from the coast are 28 fathoms; at half a mile, 38; at one mile, 50; at two miles, 66; and at three miles, 80 fathoms.

On the south side of Fora islet at a quarter of a mile distant from the shore there is a depth of 31 fathoms; at three quarters of a mile, 60; and at one mile it deepens suddenly to 130 fathoms.

SAN LOURENZO POINT, on which there is a semaphore station, forms the eastern extreme of the island of Madeira; it is a narrow, irregular, rocky peninsula about a mile long. The land comprising the point is highest at the edge of the cliffs on the northern side, and thence slopes to the southward. San Lourenzo point is almost separated at high water from Furado point, which is a bold basaltic point with an archway worn through it. Steam vessels can obtain temporary anchorage in a small bay immediately west of Furado point.

Gaivolas point, lying N.W. by W. distant 2⅓ miles from Fora islet, is conspicuous from seaward, as close west of it is situated a hill 380 feet high, on the summit of which there is a chapel with white walls and red roof.

Canical point lies W. by N. distant 1½ miles from Gaivolas point, the coast between being lower than that to the eastward. From Canical point the land rises to the north entrance point of Machico bay, from which rocks extend a distance of about 1¼ cables. A rock, on which the sea breaks, lies S.S.E. ½ E. distant 2 cables from the north entrance point of Machico bay.

Machico bay, a small bight surrounded by a stony beach, is celebrated as the reported landing place of Robert Machim, the discoverer of Madeira.

Queimada point, a rocky cliff with some flat rocks at its base, is the southern entrance point of Machico bay; from it Santa Katarina point (recognised by a steep rock 36 feet high lying close to it) bears S.W. ½ W. distant 1¼ miles.

The coast in the vicinity of Santa Katarina point is bold and has no detached dangers lying off it.

Santa Cruz.—Between Santa Katarina point and Guindante point, the next projection to the westward, is a bay on the northern shore of which is situated the village of Santa Cruz.

Porto Novo lies west of Guindante point, in a small shingle bay where a considerable stream has its outlet.

Atalaya point, lying S.W. from Guindante point distant 9 cables, has a curious small pointed peak on the cliff close to it. From this point the coast curves slightly inwards to Oliveira point.

Oliveira point, from which Brazen head bears W. ¼ N. distant one mile, is a clean rocky point, steep-to, upon which easy landing and ascent may be effected.

Brazen head, or Cabo Garajao, is a bold rocky headland, jutting out about 350 yards at right angles with the line of coast to the eastward of it. It is faced by perpendicular reddish yellow cliffs, and above them is a narrow hilly ridge crowned by a rocky knob, 420 feet above the sea, which particularly distinguishes the head when seen from the westward.

Westward of Brazen head there is a small shingle beach.

Signal station.—Upon the summit of Brazen head, near the rocky knob, is a signal station, which commands an extensive view to the eastward, and reports all vessels seen in that direction to the telegraph station on Loo rock.

Soundings.—Brazen head is steep-to, there being 7 fathoms within 20 feet of the cliffs; 38 fathoms a quarter of a mile off shore; at half a mile from the coast, 75 fathoms, and at 6 cables off there will be found a depth of 200 fathoms. The 100-fathom line, between San Lourenzo point and this head, follows the general direction of the coast, at distances varying from 6 cables to one mile.

FUNCHAL BAY.*—From Brazen head, the eastern extreme of Funchal bay, Cruz point, its western limit, bears W. by N. ½ N., distant 5 miles. The fort of Santiago lies 7 cables within this line of bearing, and midway between the points. Between Brazen head and fort Santiago the coast is formed by a series of rocky cliffs and small stony points, westward of that fort a shingle beach extends 7 cables in front of Funchal, and terminates at fort San Lazaro. The shore then becomes rocky, and rises into a bold basaltic bluff opposite Loo rock, a little west of which the bluff turns abruptly inland and disappears, the shore sloping to the peninsula of the Pontinha.

Pontinha.—The Pontinha is an artificial embankment carried out in a south-easterly direction from the land to a small islet, which is crowned by the fort of San José. This work affords some shelter from S.W. winds, on its eastern side is the most convenient landing place, there being on the northern side of the islet a flight of steps which lead to the fort, and to the top of the embankment.

Landing.—A heavy surf commonly prevails along the whole of the beach in Funchal bay, and renders communication between vessels and the shore difficult. Landing is seldom attempted but in native boats. This is a very serious inconvenience; nevertheless nearly all mercantile business is carried on from the beach; and through the experience and dexterity of the native boatmen, aided by the build and lightness of their craft, accidents but seldom happen.

The boats of vessels-of-war and steam packets usually land at the steps of the Pontinha, but it is at rather an inconvenient distance from the city.

Loo rock, the natural landmark for the anchorage in Funchal bay is a steep rock, 70 feet above the sea, rendered by art quite inaccessible except by steps built on the side opposite the land. The extreme length in an east and west direction of the rock is about 100 yards, and its breadth 35 yards. The nearest distance from the west extreme of Loo rock to the east extremity of Pontinha is about 110 yards; and from the nearest part of Loo rock, to the beach of large stones at the base of the basaltic bluff opposite it, is 175 yards nearly.

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* *See* **Admiralty plan:—Funchal bay, No. 1,689; scale, *m* = 11 inches.**

Fortification.—The whole summit of Loo rock is formed into a fort to command the anchorage, containing barracks, store-house, magazine, and chapel. There is a telegraph station in connection with the government house at Funchal and also a semaphore station.*

The telegraph wires cross the channel between Loo rock and the main at a height of about 80 feet above low water.

Shelter.—Vessels sheltered under Loo rock are moored with their heads towards it by cables, either secured to the rock by large ring bolts or passed through holes cut in the lower part of it for that purpose, the stern fasts being secured to the opposite shore. The depth of water varies from 3 to 5 fathoms, rocky bottom.

LIGHT.—From an iron column in the fort on Loo rock, at an elevation of 112 feet, a *fixed red* light is exhibited, visible in clear weather for a distance of 8 miles.

Mountain streams.—Three streams which have their source in the high lands near the centre of the island, discharge their waters into Funchal bay. Two of them named Joao Gomez and Santa Luzia, have their outlets at a fort named Pelourinho, nearly midway between Santiago fort and the castle of San Lazaro. The third, San Paulo, enters the bay between Pelourinho fort and fort San Lazaro. During summer these streams are generally inconsiderable, but during the heavy rains which occur in winter they have occasionally come down with overwhelming force, and caused much damage to the city.

Soundings.—The soundings over Funchal bay are regular, and the quality of the bottom a fine dark sand, with some little mud.

On the meridian of Loo rock, at the distance of a quarter of a mile from the shore, the depth is 25 fathoms, at half a mile 38, at three quarters of a mile 58, at one mile 100, and at one mile and a quarter 200 fathoms.

Anchorage.—In the summer months, when land and sea breezes prevail, vessels may anchor anywhere in the bay (except near the wrecks off Loo rock) as most convenient; but the best anchorage, especially during the winter months, is south of Loo rock, with the centre of the citadel named Forte do Pico, seen midway between Loo rock and the fort of San José on the Pontinha, bearing N. by E. ¾ E., keeping in mind that the west extreme of Loo rock, in line with the ruin on Pico do San Joao, leads over the position of the outer sunken wreck. On this line of bearing steam vessels may anchor in 12 to 18 fathoms, and sailing vessels in 25 to 35 fathoms, fine sandy bottom, the latter depth being found at about 4 cables from Loo rock. Should any vessels have previously taken up these positions, it is more advisable to anchor westward than eastward of them.

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* German Notice to Mariners, No. 17 of 1878.

Merchant vessels are not allowed to anchor off Funchal between sunset and sunrise, but they may anchor on the quarantine ground, west of Loo rocks.*

Westerly gales.—During winter small vessels frequently put to sea on the approach of a gale, but a large steam vessel may ride safely in 19 fathoms, with Loo rock bearing W.N.W. distant 3 cables.

Caution.—Steam vessels, that are prepared to weigh at short notice, anchor off the city in less than 10 fathoms, and the Cape mail packets anchor between Loo rock and the shore in 3½ to 4½ fathoms, but vessels of war are recommended, by day, not to shut in the west point of the bay with the south part of Loo rock, nor bring the castle of San Lazaro to bear westward of N. by W.; at night, Loo rock light (fixed *red*) should not be brought to bear southward of West; nor should a vessel ever anchor in less than 9 fathoms at low water.

If detained in Funchal bay it is necessary to sight the anchor occasionally.

Wrecks.† —The anchorage in Funchal bay is obstructed by two sunken wrecks, the position of each of which is marked by a green buoy.

The southern wreck lies in 25 fathoms, with Loo rock lighthouse bearing N. ¼ E. distant 3 cables; the northern wreck in 18 fathoms, with the same lighthouse bearing N.W. distant 2½ cables.

The positions of the buoys are not to be depended upon in stormy weather, and, as the anchors of several vessels have been lost by fouling these wrecks, mariners are cautioned not to anchor near them.

Telegraph cable.—The submarine cable to St. Vincent is laid in a S.S.W. direction from a small cove south of the church of N. Senhora do Socorra, near fort Santiago: vessels when about to anchor should not bring fort Santiago to bear north of N.E. by N. to avoid fouling this cable.

Tides.—It is high water, full and change, in Funchal bay at 0h. 48m.; springs rise 7 feet. The tidal wave strikes these islands nearly at the same time as the Azores, the flood stream running to the north-eastward at the rate of 1½ miles per hour at springs, and in the narrow channels between Dezerta islands and off San Lourenzo point, it sometimes attains the velocity of 2 miles per hour.

Coaling.—If intending to coal from the beach store, vessels should anchor 2 cables off shore in 12 fathoms, mud, Loo rock lighthouse bearing

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* Shipping Gazette, February 11th, 1875.

† Captain Sir G. S. Nares, H.M.S. *Alert*, 1878.

W. ¾ N. and Bangers pillar (near the coal store) bearing N.E. by N.; if intending to coal from colliers, anchor a short distance to leeward of them, and the coal boats will drop down with their loads; if intending to coal from Pontinha (whence vessels of war at all seasons generally obtain their supplies, and other vessels when there is too much sea to coal from the beach during westerly winds), anchor in 12 fathoms with the west extreme of Loo rock bearing N.E. ½ N. distant 1⅓ cables.* A large vessel can be supplied with coal in bags, by boats containing 9 tons, at the rate of 25 tons per hour.

Signals.—A white flag with St. George's cross indicates the position of the coal store on the beach; the flag is always hoisted when coaling from the beach is practicable. No signal is hoisted at the store when the surf on the beach prevents coaling in the regular way; in such cases coals will be shipped from the Pontinha, west of Loo rock.

A wheft hoisted at the fore indicates an order to send off coals; this, when shown by steam vessels in sight of the port, will bring coals alongside as soon as they anchor. Colliers, when desiring vessels to coal from them, will make a similar signal. Suitable boats, with able, active men, coaling bags, &c., are in constant readiness to ensure despatch, and can put on board 120 to 160 tons of coals per day. All the coals are stored under cover to prevent deterioration.

Funchal.—The city of Funchal extends along the shore of the bay front the fort of Santiago on the east to the river San Paulo on the west, a distance of about three-quarters of a mile. The densely populated portions of it do not extend back perhaps more than a quarter of a mile; but the extent of suburbs is not easily defined, as there are quintas (farmhouses) scattered over the numerous ridges behind the city to very irregular distances. It contains a population of 16,776 (1876).

The view of Funchal from the anchorage is extremely beautiful. The most conspicuous objects on the west side of the bay are the Pico da Cruz, the Pontinha, Loo rock near it, and the old fortress of the Pico on a rocky eminence half a mile north of them; to the eastward of these the castle of San Lazaro, the official residence of the Governor, situated near the beach, and the outlet of San Paulo river, Bangers pillar on the beach near the Custom-house, and on the extreme east of the castle of Santiago, and the quintas upon the sloping land behind it.

One of the most conspicuous objects seen when approaching Funchal bay is the church of Nostra Senhora do Monte, situated on a ridge 1,965 feet high, about 2 miles north of the city.

A multitude of buildings, religious and domestic, with numerous mirantes, or high square turrets, all dazzling white, and covered with red tiles, fill up the intervening spaces, and reach far back up the rising grounds beyond the city, in the midst of gardens and vineyards.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1876.

Mail steam packets between England and the Cape, and between England and the West Coast settlements, call weekly at Madeira.

Those between Lisbon and St. Paul de Loando touch at Funchal once a month, and there is also a monthly line of steam vessels between Lisbon and Funchal.

Supplies.—The markets of Funchal are well supplied with fruits and vegetables and all necessary refreshments; and there is an ample supply of excellent water, supplied at the cost of 10 shillings per ton.

Storms.—In October 1842, Funchal was visited by one of the most severe storms that had occurred since the flood of 1803, when upwards of 400 persons were swept into the sea; and had the deluge of 1842 occurred at night, as was the case in the former catastrophe, there is no doubt but hundreds of persons would have been drowned. However, few lives were lost, except in the distant parishes, where several hundreds of persons were carried into the sea.

In Funchal bay (on the 16th October), out of six vessels that were caught at anchor by the hurricane, only one escaped destruction.

Land and sea breezes.—During summer, when the land and sea breezes prevail, it requires the exercise of some judgment to get to the anchorage off Funchal, and the time of day must be borne in mind. The sea breeze from S.W. to W.S.W., and sometimes were westerly, sets in generally from 9 to 10 in the morning, and gradually dies away towards evening. About 9 or 10 at night a gentle land wind springs up, which in its turn subsides towards the morning, leaving an interval of 4 to 5 hours calm before the sea breeze again sets in.

Directions.—During summer N.E winds blow freshly up to Brazen head over San Lourenzo point, and continue on in that direction, leaving Funchal bay and a large space to the westward of it in calms, baffling, or light winds. If then a vessel reach Brazen head too late to avail herself of the land wind, and too near the time when the sea breeze may be expected, the head should be given an offing of two or three miles, and the vessel kept to the westward in the stream of the N.E. wind, until Funchal bears about North; then haul in for it, and the calm region will soon be entered; shortly after, the sea breeze springing up will make a fair wind to the anchorage.

If the vessel reaches Brazen head when the sea breeze is nearly over, she may keep near the head for the advantage of the coming land wind, and may often derive great assistance from her boats. Vessels-of-war especially may tow into the anchorage during the calms or land winds of the night and early morning.

The land wind usually springs up earlier, and continues longer after rain; and the sea breeze sets in earlier and is more steady during fine dry weather; even a few partial showers sensibly affect this.

Approaching from the northward.—During winter N.E. winds blow very strongly, accompanied by thick weather, when it is recommended to make Porto Santo to leeward, then the light on Fora islet (which bears from the south-west extreme of Porto Santo S.W. by W. ⅓ W., distant 21 miles), passing between it and Chao island, the north extreme of which bears from Fora islet S. by E. ¼ E., distant 10 miles. After getting under the land, should night come on, it is recommended, unless wishing to steam to the anchorage, to heave-to, with Loo light bearing about North.

Leaving Funchal.—The best time to leave Funchal under sail is with the first of the evening land breeze.

During winter months every care should be taken to watch the indications of the weather, swell into the bay, drift of clouds, &c., and it will be advisable, if these indications are unfavourable, to quit the anchorage before real difficulties arise.

Coast.—Cruz point (the western entrance point of Funchal bay) is composed of high and perpendicular cliffs, at the south-west extremity of which there is a semi-detached pointed rock on which is a small iron cross. The coast from the Pontinha to this point is cliffy, steep-to, and clear of danger beyond a short distance from the shore; and the 100-fathom edge of the bank continues nearly parallel with it, at the distance of about a mile.

Immediately westward of the Pontinha is situated a shoal bay, surrounded by a sandy beach at the foot of cliffs; in this bay are two small flat rocks (S. João rocks) a few feet above water.

Ilheo do Gorgulho is a detached rock, shaped like a sugar loaf, lying 130 yards from the shore, two thirds of a mile east of Cruz point.

Girao cape, lying N.W., distant 3⅓ miles from Cruz point, rises steeply from the sea to a height of 1,600 feet; on the high land above this cliff, there is a grove of pine trees 2,079 feet above the sea.

Sol point, 5⅓ miles north-west of Girao cape, is a bluff rocky cliff, with a village situated in the ravine west of it.

Jardim point is the extremity of a landslip lying N.W. ½ N., distant 7 miles from Sol point; it may be recognised by the small village containing a chapel situated on its summit.

Coast.—The south-west coast of Madeira is generally cliffy, and but little indented; the principal bights are,—

Praya Formosa (at the head of which there is an extensive shingle beach), situated immediately west of Cruz point;

Camara de Lobos, 2 miles north-west of Cruz point, with a town at its head, and a small fort on its western entrance point.

Magdalena is the name of a small village, situated in a bight 2⅓ miles north-west of Sol point.

Calheta is a more important town, built in a narrow ravine, lying 5 miles north-west of Sol point; the town is not seen except when abreast of it.

Paul do Mar is the name of a village built at the eastern extremity of a landslip, which lies 1¼ miles north-west of Jardim point.

Pargo point, the west extreme of Madeira, and on which there is a semaphore station, lies in a general direction N.W. by N., distant 20 miles from Cruz point, the intermediate country being cultivated on all practicable spots, while at 3½ miles inland the mountains are from four to five thousand feet high.

The bluff of Pargo point is composed of bold rocky cliffs 930 feet high; and the smooth round-topped hill, which is half a mile eastward of it, is 1,380 feet high. A chapel is situated on the heights one mile eastward of Pargo point, 1,512 feet above the sea, and another chapel at an elevation of 1,623 feet stands a quarter of a mile east of the cliffs of Faja da Ovelha point, 2¾ miles south of Pargo point.

Fishing village.—At 1¼ miles south-east of Pargo point there is a fishing village and landing-place.

Soundings.—Some rocks and large stones lie scattered around the base of Pargo point, a few extend to the distance of 300 yards; and a ridge of rocky ground extends nearly 1½ miles from the point to the north-west, on which, in strong westerly winds, there is a heavy sea. The soundings on it are very regular, from 11 to 19 fathoms, and 33 fathoms are found close to its outer extreme, while at a distance of 2¼ miles from the shore the bank drops to a depth of more than 100 fathoms.

South-west of the bluff of Pargo point the bank extends W. by S. for a distance of 4½ miles, with 40 to 50 fathoms over it, the bottom being generally a light brown or dark gray sand, with occasional casts of rock; from these depths it increases very suddenly to 200 fathoms, whence to Funchal the bank follows the conformation of the shore at a distance of about 1½ miles.

Coast.—Tristao point, the north extreme of the island of Madeira, is a high bold bluff 1,070 feet above the sea; it bears from Pargo point E.N.E. distance 5 miles. The coast between is formed by an indented line of coarse stony beach, with high rocky cliffs arising abruptly from it. Above the cliffs the land has a very steep ascent to the ridge of mountains two miles distant, some peaks of which exceed 4,000 feet in elevation. The cliffs are broken by several mountain torrents, waterfalls, and deep ravines; and there are two extensive landslips, which are for the most part terraced and laid out in vineyards. A few huts may be seen between the vines.

A church is situated on the heights three-quarters of a mile southward of Tristao point, at an elevation of 1,709 feet.

Soundings.—The shore between Parga point and Tristao point is clear, without any off-lying dangers, and midway between the points, at a quarter of mile from the beach, there is a depth of 10 fathoms; at half a mile from the coast 22 to 25 fathoms, and at one mile 30 to 40 fathoms; outside the 50-fathom line the bank deepens rapidly, and the 100-fathom line is about 1½ miles from the land. The general quality of the bottom is a fine dark sand.

Northward of Tristao point a few sunken rocks extend 150 yards from the coast, but at a distance of 250 yards north of it there is a depth of 7 fathoms; at a quarter of a mile 8; at half a mile 27, and at one mile 42 fathoms, fine dark sand.

On the meridian of Tristao point the 100-fathom line lies about 2 miles off shore, but after passing Rabacal rocks it turns to the south-east, approaching within 6 cables of Moniz island, and 9 cables of Seisal point. Off Delgada point in a north-west direction, the 100-fathom line is about 1¼ miles from the shore, and 2½ miles distant in a north-east direction.

CASTELLO POINT bears N.W. by N. from the east extreme of Fora islet, the intermediate coast being steep-to, the point is formed of reddish cliffs, high, bold, and perpendicular, 534 feet above the sea; the highest part of the land in the vicinity being 614 feet high; a rock, which breaks, lies close to Castello point.

Castanho peak.—Nearly 4 miles westward of Castello point and three quarters of a mile inland, is situated the eastern mountain of Madeira, a green wooden peak, named Castanho, 2,058 feet high; the land eastward of it has a steep descent to the town of Canical.

Brancas island lies about 250 yards north-west of Castello point; it is a tall sugar-loaf rock, with an archway through it. The summit is inaccessible and of a white colour.

Coast.—S. Jorge point lies 12 miles north-west of Castello point; the coast between forms a bight 2 miles in depth, at the head of which nearly midway, is situated Porto da Cruz, a small bay with rocky shores and points and a small town at its head; eastward of that the coast is formed by bold rocky cliffs of great elevation as far as the meridian of Canical; thence the cliffs rise from the sea with equal abruptness, but are of less height, and continue to decrease in elevation as they advance eastward to Castello point, having many off-lying rocks and islets at their base.

Rocks and islets extend from the shore in the vicinity of Porto da Cruz for a considerable distance; the largest and highest of these (Ilheo da Cruz) lies 1½ cables north-east of the northern entrance point of that bay.

About 2¾ miles north-west of Porto da Cruz, is situated a bight, about

4 cables deep, the south extreme of which is known as Fayal point, a comparatively low narrow point with perpendicular cliffs at its extremity, and to the eastward of which, at a distance of 3 cables, is situated the black islet of Fayal, 74 feet high.

From the high black narrow point (Cortada point), which forms the north extreme of this bight, the coast, without any deep indentations, and few off-lying rocks and islets, trends N.W. by N. for 2 miles to St. Anna point, and thence N.W. to S. Jorge point.

S. Jorge point, the north-east extreme of Madeira, is a high, bold, rocky bluff nearly 700 feet above the sea. The perpendicular cliffs which face it are of a dirty red colour, and afford landing in fine weather, though there are no means of ascent.

At a distance of 3 cables S.E. by E. from S. Jorge point there is a small rock just visible at low water, and steep-to all round.

Moniz island lies 13¼ miles N.W. by W. ½ W. from S. Jorge point, and E.S.E., distant 1½ miles, from Tristao point; it is situated 120 yards north-east of the point of the same name, and is of a yellowish colour, 250 feet high and 300 yards long from east to west, by 100 yards in breadth; it is steep-to.

Coast.—Between S. Jorge point and Moniz island the coast forms a bay, which at S. Vicente, midway, is 2¾ miles within the line of the outer points; here is an extensive valley and large stream. The coast of the bay is principally rocky, the most prominent features being Delgada point and Seisal point.

At the western part of this bay, lying near the shore and bearing S.S.E., distant one mile from Moniz island, are situated Janella rocks, five in number, the outer and largest being about 130 feet high, and of a yellowish colour.

Delgada point lies 4 miles W. by N. ¼ N. from S. Jorge point; it is comparatively low, projecting 3 cables, and is composed of rocky cliffs; rocks and boulders extend from it under water for a distance of 300 yards, there is generally a swell, and at times tremendous rollers and heavy breakers on them. There is a town on the summit of the point situated near the cliffs, from which the land rises to the interior of the island, and shows a considerable extent of cultivated country.

Landing place.—Close to Delgada point on its eastern side is a small bay and shingle beach, which offers the best landing in the vicinity.

Seisal point, a comparatively low cliff, lies 4 miles S.S.E. ½ E. from Moniz island; it is steep-to and has a landing-place on its eastern side.

Rabacal rocks.—E. ¾ N., distant 9 cables from Tristao point and half a mile off shore, is situated a cluster of flat rocks, a few feet high, on which the sea generally breaks. They are steep-to, with no outlying dangers, and there are 17 fathoms between them and the shore. No vessel should pass them in soundings.

DEZERTA ISLANDS are three rocky islands lying off the eastern extreme of Madeira, from which their northern extremity bears S. by E. ¼ E., distant 10 miles. The northern island of the group is named Chao, the centre Dezerta Grande, and the southern Bugio; their general direction, from Sail rock to the south point of Bugio island, is South, for a distance of 12½ miles.

The Dezertas have no permanent inhabitants, but are occasionally visited from Madeira by fishermen and herdsmen, also by those in search of orchilla (sea weed).

Sail rock.—At 100 yards north of the bold bluff which forms the north extreme of the group is situated a remarkable rock, commonly known as the Sail rock; it is a mere column, 160 feet above the sea.

Soundings.—From the east extreme of Madeira, a bank of soundings extends across to Chao island, which is about 2 miles wide within the 100-fathom line at its narrowest part. The depth along the middle of the bank, until within one mile of Sail rock, is from 45 to 75 fathoms, and in moderate weather fishing boats frequently anchor there. This bank continues entirely around the Dezertas; on the east side the 100-fathom line being 1½ miles distant from the shore, on the west side 2 miles, and on the south side 1½ miles. The depths on this bank are tolerably even, except off the north extreme of Chao island, where the soundings are irregular, and under 15 fathoms for a distance of one mile off shore. The bottom is diversified with fine sand of various colours, coral, shells, and rock.

Chao island is a bare table-topped island surrounded by high rocky cliffs; it is nine-tenths of a mile in length, and one-quarter of a mile in breadth at its north extremity, which is a high bold bluff, 325 feet above the sea, and off which rocks extend for a distance of 2 cables; at the south extreme it terminates in a very narrow point, from which rocks extend S. by E. for a distance of one cable, leaving only a boat passage between them and the north extreme of Dezerta Grande.

Landing.—On the west side of the island, one third of its length from the south extreme, is situated a cove, which affords the best landing.

Dezerta Grande island.—This is the largest and most elevated of the Dezerta group; its shores are generally steep and rocky, and high bold cliffs of rock characterise the greater part of them. The island is 6⅓ miles in length, by one in breadth at Pedegral point, which is its widest part. From the high land in the interior of the island south-east of Pedegral point, there is a continuous rocky chain of heights to the south extreme, the most elevated peak being a rocky hill 1,600 feet above the sea. Northward of these high lands, there is a double ridge of hills, with an extensive valley between them.

Fresh water.—At the head of the valley, near the centre of the island, there are ponds, and a spring yielding a small quantity of pure water.

West coast.—The western coast of Dezerta Grande island consists of high broken cliffs, with here and there a large fragment fallen at their base.

Landing.—On the west side of the island, 1⅓ miles from the north extreme and two-thirds of a mile north of Pedegral point, is situated a small cove (P. Castanheira) that affords landing.

East coast.—The general character of the east coast of the island is that of a rugged, broken, irregular line of cliffs, having in many cases slopes from them to the stony points, which originate in occasional landslips from these cliffs.

Bugio channel.—From Boquerao point, the south extreme of Dezerta Grande island, the north point of Bugio island bears S. by W. ½ W., distant 7 cables. Both points are clear, having 7 fathoms water within 30 yards of them, and the channel between them is free from danger, the depth in it being from 19 to 20 fathoms.

Bugio island is 4 miles in length in a north and south direction. The coast on the east side between the extreme points forms a bight half a mile in depth. Both shores are formed by rocky cliffs of less altitude than those of Dezerta Grande, surmounted by a very sharp serrated rocky ridge of hills, which extends the whole length of the island. Near the centre of Bugio island there is a gap, which seen from a distance gives it the appearance of two islands. The breadth of the island at the gap is 200 yards ; its greatest breadth does not exceed half a mile. The highest peak on the northern part of Bugio island is 1,300 feet high, that on the southern part is 1,070 feet above the sea.

Tides.—The tidal streams set by the Dezerta islands during springs, at the rate of 1½ to 2 miles per hour ; the flood in the direction of N.E. by E., and the ebb S.W. by W. Springs rise 7 feet.

Caution.—There is much danger to vessels passing close under the lee of these islands with strong breezes, from the violence of the gusts, which are most variable, both in direction and strength.

PORTO SANTO ISLAND. — This island, containing about 4,000 inhabitants, is a dependency of Madeira, and its government is administered under authority from that island. It is 6½ miles in length from N.E. to S.W., the mean breadth being 2½ miles, and it is about 17 miles in circuit. Porto Santo stands on an extensive bank of soundings, and its salient points are distinguished by small islands and islets lying off them.

The north-eastern portion of the island consists of numerous rocky sharp mountains, some of them nearly 1,700 feet in height, with bold cliffs facing the sea, and all its northern coast is characterised by high rocky cliffs, generally inaccessible, with rocks, some above and others under water, lying along their bases.

The central portion, though considerably less elevated than the extremities, is high near the cliffs of the north and north-west coast, where in some places it is 700 feet above the sea. From thence it slopes to the southward, and terminates in a white sandy beach, which forms the entire south-eastern shore. On the central portion of the island are several sandy plains covered with what appear to be fossil heath stems, but it would seem probable that they are coral formations.

The south-west extreme of the island is rocky and elevated, some of the hills exceeding 900 feet in height, and one peak, named Anna Ferreira, is distinguished by the columnar structure of its summit.

Population.—The inhabitants of Porto Santo, in 1876, numbered 1,760.

Porto Santo bay.*—This bay, on the south-east side of the island, having Baixo island for its western and Cima island for its eastern limit, affords fair shelter in settled weather. A convenient berth is 6 cables off shore, in 12 fathoms, with Pico do Castello bearing N. ¼ W., and the south extreme of Cima island E. by S. ½ S. A large vessel should anchor in 17 fathoms, with the south extreme of Cima island bearing E. ½ S. Within the depth of 15 fathoms the bottom in the eastern part of the bay is either sand, or sand and shells; outside that depth it is coarse sand or coral.

Care is necessary in anchoring, as the 100-fathom line is about half a mile southward of the latter berth.

Villa Baleira, or Porto Santo, is situated near the centre of the bay; the church and court house are conspicuous, and close west of them there is a small fort.

Caution.—During the fine weather, which usually accompanies the summer months, vessels anchor nearer the shore, but care should be taken to avoid being caught in the bay when the weather is not settled, for southerly winds of any strength throw a high sea into it.

Supplies.—On the comparatively low part of the island between its north-east and south-west extremities, wine is produced, and most varieties of grain, vegetables, oranges and fruits, but the island is remarkably destitute of trees and water; live stock and poultry are plentiful.

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* *See* Admiralty plan:—Porto Santo bay, No. 1,688; scale, $m = 3$ inches.

The island of Porto Santo is of more use to the mariner as a landmark than for supplies, since whatever it can afford is more readily obtained at Madeira.

Fish.—The sea around the shores of the island abounds with fish; one of the best fishing banks lies off the south extreme of Cima island.

Landing.—The landing at Porto Santo bay is usually effected upon the beach in front of the town.

Tides.—It is high water, full and change, in Porto Santo bay at 0 h. 50 m.; springs rise 7 feet.

Incaō point, the south-east extreme of Porto Santo, is formed by cliffs terminating in a low rocky point, off which lie several rocks.

Cima island is bare, 361 feet high, three quarters of a mile long, in a north-west and south-east direction, by 400 yards in breadth; it is steep-to except at its north-west extreme, where a boat passage of 2 cables in width exists between it and Incaō point.

Frades point, lying N.E. by N., distant one mile from Incaō point, is a bold steep point; the bight between Frades point and Cima island is known as Porto dos Frades.

Penedo Redondo, a rock a few feet above water, lies S.S.E. from Frades point, distance 1½ cables.

Branco point.—The north-east extreme of Porto Santo is composed of three bluffs, the northern being a bold promontory 1,390 feet high, off which lie three rocky islets with navigable channels between them. At one mile south of the southern bluff there is a sandy beach and stream at the head of a bight.

Pescador islet, the inner of the islets lying off Branco point, bears from that point E. by N., distant 3 cables; it is composed of rocky cliffs, covered with trees, 358 feet high.

Lourenzo rock, the middle islet, is a cluster of rocks, with a few trees upon them, 38 feet above the sea, bearing from the summit of Pescador islet N.N.E., distant 6 cables.

North-east rock, the outer islet, lies 6 cables N.N.E. from Lourenzo rock; it is of nearly the same size as Pescador islet, and, like that, its coasts are composed of steep, rocky, irregular cliffs; it is thickly wooded, and near the centre there is a peak 330 feet high.

S. Cruz point, lying N.W. ¾ W. from Branco point, distant 1½ miles, is a sharp point, with a rock a few feet high lying one cable north of it; between S. Cruz and Branco points the coast forms two bights.

Fonte island, is small, black, and of basaltic structure, 270 feet above the sea; it lies N.W. by N. distant one mile from Fonte point on the north shore of Porto Santo, and is steep-to; there are 16 fathoms between it and the shore.

Coast.—The north coast of Porto Santo is cliffy, and trends W. by S. from S. Cruz point for a distance of 3 miles in nearly a direct line; at this distance the coast trends more southerly and is more indented for a distance of 3 miles to Furado point.

Furado point is a double point, both projections of which are considerably lower than the adjacent cliffs, which are about 900 feet high and which gradually decrease in height to the southward, terminating at Calheta point, the west extreme of Porto Santo bay.

Ferro island, lying off the west point of Porto Santo, is of triangular form, each side being about half a mile in length. The coast consists of rugged and almost inaccessible rocky cliffs, above which is a scanty soil, covered with coarse grass. The most elevated land lies near its north coast, and is 380 feet above the sea. A ledge of rocks extends towards the shore of Porto Santo, leaving a channel 330 yards wide. The island is steep-to on its west-side, and the 100-fathom line is about 7 cables from the shore.

Baixo island lies 450 yards off the south-west extreme of Porto Santo. The channel between them is safe for boats in moderate weather. The island is 1½ miles long from north to south, and its greatest breadth is three-quarters of a mile. It is surrounded by high rocky cliffs, steep-to except at the north extreme.

Viewed from the east or west, Baixo island presents a somewhat table-shaped summit, having a hummock, near its north extreme, that is 570 feet above the sea.

Limestone.—On the west side of the island, close southward of the rocky head which forms the north extreme, there is a cove from whence quantities of limestone, with which the island abounds, is shipped by the boatmen of Madeira. The presence of limestone on so small an islet is remarkable, the more especially as it is not found either on Porto Santo, the Dezertas, or Madeira, a small spot in the valley of San Vicente on the latter island excepted. It is quarried from veins forming galleries, entered at the sides of the cliffs.

Soundings. — The 100-fathom line lies 6 cables from the south extreme of Baixo island, and the same distance from the west portion of Porto Santo bay, whence it continues in an easterly direction to Cima island, off which it lies in a S.S.E. direction at a distance of 2½ miles, forming a narrow fishing bank. From Cima island to N.E. rock the 100-fathom line is generally about a mile from the shore, and it lies about 2 miles north of that rock. The least water found on this portion of the bank was 10 fathoms, at a distance of 1⅓ miles north of N.E. rock. From the north-west coast of Porto Santo, the bank of soundings to the 100-fathom line extends off 8 miles, the general depth on it is from 25 to

35 fathoms, the bottom consisting of fine white sand, rock, coral, shells and gravel.

Falcon rock. — Near the north-east margin of the bank which extends north-west from Porto Santo is situated Falcon rock, on which there is 4½ fathoms at low water. It stands on a rocky shoal 3 cables long by 2 cables broad, on which are 11, 15, and 17 fathoms, and the sea is reported to break heavily upon it in stormy weather.

From the rock N.E. rock bears S.E. ½ S., distant 6¼ miles ; Fonte island S. ¾ W. 4½ miles, and Ferro island S.S.W. ½ W., distant 8¼ miles. On the east side of Falcon rock the 100-fathom line is half a mile distant.

Clearing marks.—If wishing to pass east of Falcon rock, when at a distance of 10 or 12 miles from Porto Santo, the eastern high land of that island should be brought to bear South, which leads 3 miles east of the rock. The western high land of Porto Santo bearing S. ¼ E. leads the same distance west of this danger.

Vessels approaching from the north-eastward with a fair wind, may pass between Falcon rock and Porto Santo, by keeping Fonte island in line with the high south-west part of Porto Santo bearing S.W. by S., until soundings can be struck, bearing in mind that Branco point, bearing S.E. ¾ S. open of S. Cruz point, leads 1⅓ miles south-west of Falcon rock.

Styx bank.—At 9 cables N. by W. ¾ W. from Falcon rock is situated another rocky bank of comparatively shoal water, named after the vessel in which it was examined, the Styx bank. The least water found upon it was 12 fathoms, with casts of 17 and 20 fathoms near it ; at 3 cables east of it the depth was 100 fathoms. Northward of Styx bank the soundings to the 100-fathom line extend one mile, and westward of it they extend 2¼ miles ; the bank then extends southward toward Ferro island at the west extreme of Porto Santo.

SALVAGE ISLANDS,* lying S. by W. distant 140 miles from Bugio island (Dezertas), and N.N.E. ½ E., distant 90 miles from Tenerife, the nearest of the Canary islands, are two groups of rocky islands, distant from each other 8 miles in an E.N.E. and W.S.W. direction, with a clear passage between them.

Great Salvage, the name by which the north-eastern group is known, consists of one large island, 455 feet high, of irregular form, about 3 miles in circuit, high, apparently bare, and visible from a distance of 25 miles ; it appears as two peaks when seen from either the northward or southward, of which the western (Burt peak) is the higher ; several small islets and rocks lie scattered around it.

Caution. — When seeking an anchorage, Great Salvage island should not be approached within 2 miles, except when bearing from N.N.E. to

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* *See* Admiralty plan :—Salvage islands, No. 365 ; scale, *m*=0·8 inches.

N.W. by N. as rocks above and below water, extend to a distance of about one mile in all other directions.

Anchorage.—H.M.S. *Prometheus* in 1813 anchored on the south side of Great Salvage island is 12 fathoms, clear ground, with the following bearings: east extreme of the island E. by N.; west extreme N.W. by N., and a breaking rock N.W. by W.

In 1866 H.M.S. *Dart* anchored in the bay on the east side of Great Salvage island, in 13 fathoms, coarse gray sand, with the entrance points of the bay bearing North and S.S.W., being sheltered from westerly winds.

Landing.—Good landing may be obtained in the centre of the bay on the east side of Great Salvage island.

Alkali, from the ashes of which barilla is procured, grows on this island.

Directions.—If wishing to anchor, make the island on a N.W. bearing and anchor in the bay on the east side; probably the anchorage on the south side would be safer in summer if the trade wind blows strongly.

THE PITONS, or south-western group of Salvage islands, consists of two islands, named Great and Little Piton; they are connected by rocks, some covered, and others above water, and landing on them at any time would be attended with great danger.

Great Piton island is 2¾ miles long in a N.E. by E. and S.W. by W. direction. Near its centre is a steep peak, 140 feet high (Hart hill), which when seen from a distance has the appearance of a sail. The island appears green on its south side, the north side being barren; it may be seen for a distance of 15 miles.

On the north-east and south-west extremes of the island are some hummocks, which from a distance appear as islets.

Little Piton island is situated one mile W.N.W. from Great Piton island and lies parallel to it. The island is flat, about three-quarters of a mile long, and rocks extend 1¾ miles westward of it.

Lecky reef, 10 feet above high water and surrounded by rocks, lies N.E. from the north extreme of Little Piton island, distant 9 cables.

Directions.—Vessels bound from Madeira to Tenerife during winter months, when westerly and south-westerly winds prevail, are sometimes unable to weather the Salvage islands, but they should not be approached within 3 miles on the east side. Care is also necessary, when in their vicinity at night time, not to be drawn too close to Piton islands; westward of them a vessel should not approach within 4 miles.

Caution.—It should be borne in mind that a direct course from Funchal to Anaga point (Tenerife) passes only 13 miles westward of Piton islands.

Current.—The general set of current near Salvage islands is to the S.S.W. and S.S.E. at rates varying from 12 to 24 miles per day.

CHAPTER IV.

CANARY ISLANDS.

VARIATION in 1880.

Tenerife - - - 19° 45′ W.

CANARY ISLANDS.*—These islands (supposed to have been known to the ancients by the name of the Fortunate islands) are eleven in number, four being small, and are comprised within the parallels of 27° 37′ and 29° 24′ N., and the meridians of 18° 10′ and 13° 25′ W.; Tenerife, the most important, occupying a central position among the seven principal islands. The group is separated from the African continent by a clear channel nearly 60 miles wide, between the south-east extreme of Fuerteventura island and cape Juby.

Discovery.—The islands are believed to have been discovered by the crew of a French vessel, driven there early in the 14th century, but it was not until near the close of the 15th century that the conquest of the whole group was effected by Spain. The land of the Canary islands is generally high, being composed of volcanic mountains, so lofty that during a great portion of the year the summits of most are covered with snow.

Population.—The population of the Canary group is about 257,000 probably almost wholly of Spanish origin.

Exports.—Wine and cochineal are the principal articles of export; in 1875 the value of cochineal exported from Gran Canaria island was 296,940*l.*

Imports.—The annual value of imports from all countries is about 780,000*l.*, cotton and woollen manufactures being the chief articles.

Climate.—In general the climate is healthy, the heat being tempered by the elevation of the islands, and the prevalence of north-east and west winds. The mean monthly temperature averages 67° F. in winter and 76° F. in summer, the daily range seldom exceeding 5°.

November and December are the only rainy months; in January the weather is generally fine, and in February the tops of the mountains become covered with snow.

Winds.—In the archipelago of the Canaries, situated near the polar limit of the north-east trade, the prevailing winds are from N.E. to North.

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* *See* Admiralty chart:—Canary islands, No. 1,894.

From the middle of November to the middle of January the trade winds are sometimes interrupted by violent gales from S.E., these however are of short duration, and the swell which accompanies them is felt two or three hours in advance. With S.E. winds there is generally much rain and thick fog, but the weather clears as soon as the wind veers to the northward.

During the same period (middle of November to middle of January) gales from S.W. and N.W. are also experienced, the latter are the more violent, but generally of short duration.

Occasionally when the trade wind is light, it is replaced by a southerly wind, accompanied by a suffocating heat resembling that which attends the harmattan.

In the principal bays there are regular land and sea breezes, but the former never extends far from the shore ; it sets in about 10 p.m. and dies away about 9 or 10 a.m., when there is a calm interval until the sea breeze commences.

In the middle of the channels between the islands the prevailing North or N.E. wind continues both night and day.

When the N.E. wind is very fresh it frequently occurs that to leeward of and near to an island, a wind from the opposite direction is experienced, locally known as the *embata* ; this is more or less fresh according to the strength of the trade wind.

With S.E. winds the bays exposed to them are very dangerous, Palmas bay in Gran Canaria island is the only anchorage which is safe during December and January.

Barometer.—At the Canary islands the barometer is very sensitive ; a rapid rise indicates an approaching easterly wind, while a fall is the precursor of West or S.W. winds.

Government.—The islands are governed by the Spanish laws, Santa Cruz in Tenerife being the residence of the governor-general, whilst the administration is directed by an *audienca* in Gran Canaria. The military force consists of 25,000 men. The islands are divided into two bishoprics, the three eastern constituting one, and the four western islands the other.

Volcanic eruptions.—The summit of the cone of Tenerife is an extinct volcano, but some eruptions have taken place during the last century from the sides of the mountain.

Directions.—All the channels between the Canary islands are clear and safe, but if passing through the group without wishing to stop, that between Palma and Hierro on one side and Gomera and Tenerife on the other is recommended, as the belt of calms to leeward of the latter islands is not so extensive as that found in the other channels.

A belt of calms generally extends 30 miles to leeward of Palma, 15 miles to leeward of Tenerife, and 25 miles to leeward of Gran Canaria island; the sea in these calm regions is frequently rough and irregular, and heavy squalls are experienced which give little warning.

When approaching the Canary islands from the southward with a foul wind, it is not advisable to attempt to beat through the channels, but a vessel should pass westward of the group.

Supplies.—The vine is cultivated on all the islands, but the best wine is made at Tenerife. Large numbers of boats are employed in fishing operations, and about 30,000 quintals of fish are taken annually.

All the islands afford excellent fruit, vegetables, and game in large quantities.

PALMA ISLAND[*] is the north-western of the group. It is 25 miles long in a north and south direction, 13 miles broad at its north part, and narrow and pointed at its southern extreme; whence to within one mile of its northern extremity a series of volcanic mountains extend, terminating in three lofty peaks, the highest being Pico de la Cruz, 7,730 feet above the sea.

Coast.—The shores of Palma island are generally safe to approach within a moderate distance, as the few rocks which lie off the points are in most cases near the coast; the northern and north-western coast is formed by cliffs, which at Gorda point (the north-west extreme of the island) attain an elevation of 1,100 feet; the east and south-west coast is formed by alternate bluffs and beaches.

Population.—The population of Palma island is about 31,200.

Soundings.—The island is surrounded by deep water, the 100-fathom line being generally about one mile from the shore.

Fuencaliente point.—The southern extremity of the island is rocky and steep, the 100-fathom line being only 3 cables off shore; from it Teno point, the western extreme of Tenerife, bears S.E. by E. ½ E. distant 48 miles; the north-west extreme of Gomera island bears S.E. ½ S. distant 30 miles; and the north extreme of Ferro island bears S.S.W. ½ W. distant 36 miles.

A remarkable hill, 780 feet high, named mount Viento is situated near the coast about 1½ miles north-east of Fuencaliente point.

Santa Cruz.—On the east side, about midway between the southern and north-east extremities of Palma island, is situated the chief port of the island. It affords a limited but secure anchorage, close off the town, in 15 or 20 fathoms water.

Three rocky islets lying near the beach, south of the town of Santa Cruz, are easily recognised by their dark colour.

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[*] *See* Admiralty chart:—Palma, Gomera, and Ferro islands, No. 1,873.

The population of Santa Cruz is about 5,400; the town is built on a sandy beach at the middle of the bay, and is well supplied with water; fresh provisions are abundant.

Cumplida point.—The north-eastern extreme of the island is clear; at three-quarters of a mile northward of the point the depth is 35 fathoms, increasing rapidly to 100 fathoms.

Five high hills rise above Cumplida point; these are conspicuous when bearing S.S.W.

LIGHT.—A lighthouse stands on Cumplida point; it is a conical building, 112 feet high, of a dark gray colour, and exhibits, at an elevation of 207 feet above the sea, a white light which revolves *every minute*, illuminating an arc of 239°, and should be seen in clear weather from a distance of 20 miles.

Muda point, the north extreme of the island, is surmounted by an isolated hill, 1,000 feet high: the most off-lying dangers in the bight between Cumplida and Muda points are Topaciagos rocks, below water, situated two-thirds of a mile west of Gaviota point (the first projection west of Cumplida point) and Manga rock, a small islet in the bight east of Muda point.

S. Domingo rock, 120 feet high, lies 100 yards off a point of the same name, about midway between Muda and Gorda points; in the small bight eastward of this rock there are two others not quite so high.

Tazacorte anchorage.—On the west side of the island about 13 miles north of Fuencaliente point anchorage may be obtained in 17 fathoms about half a mile from the shore, northwest of the large village of Tazacorte, it is however completely open to westerly winds. Juan Graie point, the northern limit of this anchorage, is 780 feet high, with a sunken rock, on which the sea breaks, lying about a cable S.S.W. from it and half a mile S.S.W. from the village of Tazacorte; about a cable from the shore at the southern part of this anchorage are situated Gabasera rocks, two of which are above water.

Tazacorte being situated on the southern side of a deep ravine with two high hills rising immediately north-east of the village, is easily recognised from seaward.

Weather.—Palma island is said to be more subject to westerly winds and rain than any other of the Canary group, and frequently to be enveloped in fog.

GOMERA ISLAND lies 15 miles west of Tenerife. It is of almost circular form, about 12 miles in diameter, surrounded by rugged perpendicular cliffs, with a few sandy beaches and detached rocks; near the coast the mountains are about 2,000 feet high, whilst near the centre of the island Alta Garaoné attains the elevation of 4,400 feet.

Population.—The population of Gomera island is about 11,300.

Soundings.—On the south and west sides of the island the 100-fathom line is about 1½ or 2 miles from the shore; on the north-west and north-east sides, nearly 4 miles; and off S. Cristoval point, the south-eastern extreme, it is 3 miles from the coast.

Bermeja rock, with less than 6 feet water on it, lies 2 cables off shore, one mile northward of S. Cristoval point; this is the only rock round the coast of Gomera island not visible at all times.

Anchorage may be obtained off Gomera island at the following places:— Westward of Mahona point, 3 miles north-west of Hocico point on the north-east side of the island, in 11 fathoms, sand; south-east of Organo point, the north extreme of the island, in 9 to 11½ fathoms, sand; in Playa de los Ingles, a bight immediately north of Calera point, the west extreme of the island; in the bight lying south-east of Trigo point, a foul point 1¼ miles south-east of Calera point; in 9 fathoms off Erece bay, a mile east of Becerro point on the south coast of the island, and in Playa de Santiago, 2½ miles eastward of Erece bay.

The western anchorages are good for temporary purposes during the summer, and the eastern in winter.

Port Gomera.—In this small bay on the east side of the island, one mile west of S. Cristoval point, is situated the principal town (San Sebastian); vessels anchor in 10 or 15 fathoms, sand and coral, and from the shelter afforded it is said to be a good place for effecting repairs; landing can be effected in all winds at the north-east corner, or in a small bight north of port Gomera (port Hilo), connected with it by a canal which is closed at night.

HIERRO or FERRO ISLAND.—The south-western island of the Canary archipelago lies 33 miles west of Gomera island; it is 17 miles long in an east and west direction, and 9 miles in breadth from its south extreme to the centre of the bight on the north side. The shores of the island are almost inaccessible, and in the middle is a high plateau, well wooded, the highest mountains rising nearly 5,000 feet above the sea.

Population.—The population of Hierro island is about 4,900.

Soundings.—The 100-fathom line is nowhere more than three-quarters of a mile from the shore; off the south extreme of the island (Restinga point) rocks extend 2 cables, and the 100-fathom line is only half a mile from the coast.

Coast.—The north-west coast of Hierro forms a deep bight known as El Golfo, the shore of which is composed of a continuous high cliff, with rocks above and below water close to its foot; the bight on the south-west side of the island is more clear of dangers.

Salmone rocks extend 6 cables from the eastern entrance point of El Golfo.

Roadsteads.—The only anchorages used are that of Naos on the west side of Restinga point, and port Hierro on the south-east side of the island; neither of them afford shelter except for boats.

A road leads from port Hierro to Valverde, the capital of the island, which is situated 1½ miles from the coast.

Rock.—At three cables north of port Hierro, and nearly 2 cables from the shore, there is a rock with less than 6 feet water on it.

TENERIFE ISLAND* is the largest, most important, and most remarkable of the Canary islands; it is triangular in shape, Anaga point, its north-east extreme, forming the apex, the north and south sides being about 45 miles long, and the west side 25 miles. From Anaga point, the north-east extreme of Gran Canaria island bears S.E. ¾ S. distant 45 miles, while the nearest part of the western side of that island is distant from Tenerife 33 miles. The shores of the island are steep-to, except at the north-east extreme. In the centre is situated the famous accessible peak, 12,180 feet above the sea, the most remarkable feature of the Canary archipelago. The peak was named by the ancients the peak of Teyde, but it is now more generally known as the peak of Tenerife. The cone is very small in proportion, being only 537 feet high, and the crater at its top is about 120 feet deep; two thirds of the entire peak is covered with vegetation.

Population.—The population of Tenerife is about 94,000.

Appearance.—As a rule, when making Tenerife from the northward, between April and October, the land is seldom recognisable till within 20 miles of it; beyond that distance it appears as a haze; the months of January and February, when the sky is slightly clouded, and just before or after rain, are the most favourable months in which to see the peak from extraordinary distances.

Coast.—The shores are bold, and excepting a few reefs extending from some of the points, all the dangers are visible and close to the shore. The coast, particularly on the west and south-west sides, is formed of high cliffs, broken occasionally by the beds of mountain torrents; along the east shore are some small beaches.

Anaga point is the north-eastern extreme of Tenerife; it has some detached rocks lying off it, and the bank of soundings extends off nearly 3 miles, narrowing towards Antequerra point, where the 100-fathom line is only one mile from the shore.

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* *See* **Admiralty chart: Tenerife island, No. 1870.**

Anaga rocks, about 60 feet high, are black rocks extending N.E. by N. one mile from the northern extreme of Tenerife; they are steep-to on the north and east sides, but dangerous.

Fuera rock, above water, with 11 fathoms round it, lies 3 cables W.N.W. from the northern Anaga rock.

LIGHT.—The lighthouse, built on Roque Bermejo point, is 39 feet in height, with keeper's dwelling attached, it is of conical form, and gray colour. From the lantern is exhibited, at an elevation of 810 feet above the sea, a *fixed* and *flashing* white light, showing a *flash* every *three minutes*, which in clear weather should be seen from a distance of 35 miles. Roque Bermejo point lies 1¾ miles N. ¾ W. from Anaga point.

Roque Bermejo islet, lying S.E. ¼ E. distant 3¾ cables from the lighthouse, is connected to the shore by a reef which covers at high water.

Mancha rock.—South of the lighthouse on Roque Bermejo point distant 1¾ miles, is situated a white conical rock close to the shore, named Mancha Blanco; it, however, frequently appears of a dark colour when seen from the offing. Mancha rock, with 14 feet water on it, lies E. by S., distant 3½ cables from Mancha Blanco; it breaks heavily in bad weather. On the same bearing, and at a distance of more than a mile from the shore, a rock has been reported. From Mancha rock, Antequerra point bears S.W. ¼ S. distant 1½ miles, and Roque Bermejo islet appears in line with the northern part of Anaga rocks bearing N. by W. ½ W. There is a depth of 15 fathoms between Mancha rock and the shore.

Caution.—When rounding Anaga point the shore should not be approached within two miles.

Antequerra point, which is about 700 feet high and bluff, projecting some distance from the line of coast, lies S.S.W. ½ W. from Anaga point, distant 1½ miles. When seen from the north-eastward it makes as an island, being connected to the main by a lower ridge.*

West of Antequerra point the coast forms a small bay, from the western limit of which the coast trends in a general westerly direction for a distance of 7 miles to Santa Cruz.

Santa Cruz, the capital of the Canary group, is a town containing about 14,000 inhabitants; it is the residence of the governor general and chief authorities.

The appearance of the town is monotonous, the streets formed by white houses with flat roofs are narrow but well paved, and the few towers and spires of the religious edifices are conspicuous from the anchorage, the most prominent among these is the Torre de la Concepcion at the southern part of the town.

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* Navigating lieutenant J. W. Dixon, H.M. schooner *Sparrowhawk*, 1877.

A line of steam vessels from Cadiz makes semi-monthly trips to Santa Cruz and Great Canary island.

Supplies.—Provisions are abundant and moderate in price. Water is good and brought off in boats, that are filled from a pipe at the mole. Wood is scarce but coal can be obtained; the coal store is situated north of Paso Alto battery.

Trade.—In 1874 the value of the imports at Santa Cruz was 426,182*l.*, and that of the exports 240,000*l.*

Santa Cruz bay* is more frequented than any other anchorage in the Canary archipelago. The bay is open to all winds between E. by N. and S.W.; a swell generally sets in, in consequence of the prevailing winds being from the eastward. S.E. gales are of rare occurrence, and vessels may ride them out at the anchorage, although it is usual to slip and get into the offing.†

Directions.—On making the north-east extreme of Tenerife, haul in upon the bank of soundings after passing Antequerra point; the bank to the 100 fathom line extends about 1½ miles from the shore until abreast of Santa Cruz, where it narrows to half a mile; having selected the depth of water for anchoring, run along shore in that depth; this will afford time to anchor leisurely.

Sailing vessels approaching Tenerife from the south-westward during the summer months, and intending to anchor in Santa Cruz bay are recommended to keep on the west side of the island, so as to profit by the *embata* or wind from the shore.

Off Teno point the trade wind will be encountered, but though violent and squally in the vicinity of this point, it becomes moderate when northward of it.

During the winter months, vessels approaching from the south-westward are recommended to keep on the eastern side of the island.

Caution.—When nearing Santa Cruz, do not bring the town to bear northward of West, to avoid calms; and remember that the current sets to the south-westward.

Landing.—From April till October, the season of regular trade winds, the sea is heavy and landing difficult.

Tides.—It is high water, full and change, in Santa Cruz bay at 1 h. 30 m.; springs rise 8 feet, neaps 6 feet.

The tidal streams sets, flood to north-east, ebb to south-west.

Anchorage.—The usual anchorage is from off the mole head, to three-quarters of a mile north-eastward of it, in 5 to 10 fathoms. With the wind on shore, a steam vessel may pass under the sterns of the vessels at anchor off the molehead, and come to, head to wind in 13 to 18 fathoms, sand, with Paso Alto battery bearing N.N.E. and fort San Pedro, north of the mole bearing W.N.W. A large vessel of war would find difficulty in anchoring so near in, from the generally crowded state of the roads, but a safe berth is in 28 fathoms, good holding ground, with Paso Alto battery bearing North, and St. Francisco spire bearing West. In this position there would be 5 fathoms at about 1½ cables inside the vessel when swung inshore. The ground to the northward of this position appears the best adapted for large vessels during N.W. winds.

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* *See* Admiralty plan:—Santa Cruz, No. 1,856; scale, *m* = 5·75 inches.

† During the latter part of January, south-east gales are of more frequent occurrence than at other periods of the year.—*Annales Hydrographiques*, 1878.

Off San Miguel valley, at the northern part of the anchorage, large vessels have held on with off-shore squalls, when others have dragged off the bank.

LIGHTS.—From a lead-coloured hexagonal lighthouse, 21 feet high, situated on the outer elbow of the mole, a *fixed* white light is exhibited from an elevation of 34 feet, that should be seen from a distance of 9 miles.

From the extremity of the mole is exhibited, from an elevation of 26 feet above high water, a fixed *red* light.

Buoys.*—Four red buoys are placed in Santa Cruz bay for the use of vessels, when getting under weigh.

Hidalgo point, the north extreme of Tenerife, is a low, sandy, and foul point with high land rising immediately behind it, it bears W. by N. from the northern Anaga rock distant 10 miles, the intervening coast forming a bight, the eastern side of which is foul for a short distance from the coast, and the western shore clean.

Viento point, bears W. by S. from Hidalgo point distant 3 miles; between these points are two bays, in the eastern of which (La Hoya) good landing can be effected.

Madera point.—From Viento point the coast trends W.S.W. in a nearly straight line for a distance of 3¼ miles to Madera point which is high and steep, and N.N.E. from which, distant a third of a mile, is situated a rock, on which there is less than 6 feet water.

Barranco Honda point bears S.W. by W. ½ W. from Madera point distant 6 miles, it is a high steep point with a rocky islet close to it.

Puerto de la Orotava.—The most fertile and richest part of the island, and principal place of export for wine, in summer, is situated 3¼ miles W. ¼ S. from Barranco Honda point and 28 miles westward of Anaga point, in the bight which forms the north side of the island. During winter N.W. winds render this place dangerous for shipping.

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* Asmonce Hydrographique, No. 169 of 1879.

Orotava, containing 3,250 inhabitants, is built at the foot of a mountain slope, and numerous detached rocks fringe the shore which should not be approached within half a mile to the eastward of the town.

Anchorage.—Vessels usually anchor off Orotava in 50 fathoms, with the peak of Tenerife bearing S.W., about three-quarters of a mile off shore.

Buenavista point bears W. by N. ¼ N. distant 15 miles from Puerto de la Orotava, the intervening coast forming a succession of small bays and bights, in the western and most extensive of which is situated the town of Garachico built on a steep round bluff, and fronted by a circular rocky islet (El Roque) lying 1½ cables from the shore.

Teno point, the north-west extreme of Tenerife, is a small peninsula, bearing about W. ½ S. from Buenavista point, the intervening 6 miles of coast being tolerably straight.

Coast.—From Teno point the coast trends in a general S. by E. direction for a distance of 24 miles to Rasca point, the south extreme of the island, it is formed of rugged basalt in some places worn into columns; it is generally clean, the rocks extending but a short distance from the shore.

The south-east coast of Tenerife is also clear of off-lying dangers and may be approached within a moderate distance.

GRAN CANARIA* or GREAT CANARY ISLAND, containing about 60,000 inhabitants, is of circular form, 25 miles in diameter and very mountainous, the highest range (Los Pexos) being 6,400 feet above the sea, it is more fertile and better watered than any other island of the group.

When seen from seaward, Gran Canaria island appears high in the centre, with a broken and serrated slope on either side to the sea ; the northern portion (Isleta) appears as a detached conical islet when seen from the eastward or westward.

The coast is generally high and bluff, being everywhere free from off-lying dangers, except off a few points on the east side.

Isleta peninsula, the north-east extreme of Gran Canaria island, lies S.E. ¾ S. distant 45 miles from the north-east extreme of Tenerife, it is about 800 feet high and cliffy, being connected to the island by a low sandy neck, 1½ miles long, and 600 yards wide. Some rocks extend north-east of the peninsula for nearly half a mile.

LIGHT.—A lighthouse stands upon Isleta peninsula on the summit of the highest and most northern hill. The tower is conical, 30 feet high, and of a dark gray colour, it exhibits, from an elevation of 817 feet above the sea, a *fixed* light, varied by a *red flash* every *two minutes*, visible in clear weather from a distance of 18 miles.

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* *See* Admiralty chart :—Gran Canaria island, No. 1,869.

Confital bay, on the west side of Isleta peninsula, being much exposed to the swell, only affords shelter for small craft within a reef of rocks in its south-east corner.

Puerto de la Luz,[*] on the south side of Isleta peninsula, lies between Sphinx head to the north-east (east of which, at a distance of 1½ cables, is situated a small islet), and Palmas point, on which stands the city of Palmas, the capital of the island, bearing from Sphinx head S.S.W. ½ W. distant 3½ miles. The coast of the bay between these points recedes 1¼ miles.

Puerto de la Luz is exposed to the S.E., but winds from that direction are very unusual, and seldom strong.

Palmas.—The city of Palmas with a population of 15,770 is built along the beach, and from the extreme whiteness of the buildings is conspicuous from seaward.

Fort Del Rey is situated on the western side of the hill of San Francisco, which rises immediately over the town.

In 1875 the value of imports at Palmas was 259,373*l.* and that of the exports 242,753*l.*

Anchorage.—A good berth is, in 12 fathoms, half a mile off shore, with Sphinx head bearing N.E.; S. Catelina fort in the centre of the bay bearing W. by N., and the mole lighthouse S. by W. ½ W. At night a large vessel should anchor soon after losing sight of Isleta light, or in about 15 fathoms.

In 1875, H.M.S. *Resistance* when proceeding out of the anchorage, obtained two casts of 6½ fathoms, with Luz castle bearing N. ½ W. distant 1$\frac{1}{10}$ miles and S. Catelina fort bearing N.W. by W. distant 7 cables.

Buoy.—A *red* buoy, moored in 12 fathoms in the centre of the bay, is intended to aid in weighing, with East and S.E. winds.

Landing is difficult, but a mole extending from the northern part of the town is in course of construction: when landing is dangerous, a flag (black and white horizontal bands), is hoisted on the mole.

LIGHT.—A *fixed red* light, visible 5 miles, is exhibited on the mole of Palmas; it cannot, however, be depended upon.

Isleta peninsula light is not visible from the anchorage in Puerto de la Luz.

Supplies.—The city of Palmas is well supplied with all kinds of provisions; water is stored in a reservoir and led through pipes to the extremity of the mole.

Gando bay.—From Palmas the coast is rocky, indented and fringed with rocks for a distance of 11 miles in a southerly direction to Gando point, off which, at a distance of 6 cables in an E. by N. ½ N. direction, is situated a rock awash, with 17 fathoms between it and the shore. Gando point is the north-east entrance point of Gando bay, which is 4½ miles across between Gando and Areynaga points, and 1¼ miles deep. Anchorage may be had with off-shore winds in the north corner of the bay, in 8 fathoms. Water and supplies may be procured.

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[*] *See* plan:—Puerto de la Luz, on Admiralty chart, No. 1,869; scale, *m*=2 inches.

Soundings.—It may be said generally that the soundings to the 100 fathom line extend further off this island than any other of the group.

On the meridian of Isleta peninsula, at a distance of about one mile from the shore, the depth is 100 fathoms, and the same depth is maintained at that distance along the north shore of the island. Off Puerto de la Luz the bank to the 100 fathom line extends 2½ miles ; off the other portions of the island the 100 fathom line follows the conformation of the coast, in some parts at a distance of 5 miles.

Winds.—During the summer months N.E. winds generally blow, which, being obstructed by the height of the mountains, leave a calm space some miles to leeward of the island.

Tides.—It is high water, full and change, in Puerto de la Luz at 0h. 52m. ; springs rise 10 feet.

Current.—On the south-west side of Gran Canaria island, during the summer months, the current sets to the westward at the rate of half a knot per hour.

FUERTEVENTURA ISLAND.* — The extreme length of this island is 53 miles, in a north-east and south-west direction, and its greatest breadth 16 miles. From a distance it appears as two islands, the south-west portion being a mountainous peninsula about 11 miles long, separated from the main island by a low white sandy neck about 7 miles long and 2½ miles in breadth.

The coast of Fuerteventura island, though generally high and steep, is indented with numerous small bays and coves with sandy beaches.

Jandia peninsula, the southern portion of the island, is occupied by a remarkable mountain 2,770 feet above the sea, named Asses' Ears, from its most prominent feature. The mountain is perpendicular on its north-west side ; on the south side it slopes gradually to the east towards the sandy neck, and to the westward it terminates in Jandia point.

The northern portion of the island consists of a group of extinct volcanic mountains, the highest, mount Muda, at the north-east part, being 2,240 feet above the sea. Near the centre of the island the ridge divides, and, following the coast on either side, unites again to the south-west, in a ridge from 1,500 to 2,000 feet above the sea, which falls abruptly to the sandy neck, connecting the two portions of the island.

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* *See* **Admiralty chart :—Fuerteventura island, No. 1850.**

Fuerteventura island is generally barren, although some of the valleys produce date palms, and fig trees.

Gorda point, the north-east extremity of the island, is low and foul for 3 cables to the north-east. Off the point, and between it and Lobos island, 3 miles to the south-eastward, there is a very confused sea when a swell comes from the westward. From the point, Pechiguera point (the nearest part of Lanzarote island) bears N.N.E. ½ E. distant 6 miles, and the lighthouse on Lobos island bears E. by S. ½ S. distant 4 miles.

Coast.—From Gorda part the coast trends west for 7½ miles, when it turns sharply to the south-westward for 28 miles to Amanay point, between which and Pesebre point there is a bight, the shore of which recedes 4 miles from the general trend of the coast.

Tostan reefs.—Rocks and shoal water extend from the north-west extreme of Fuerteventura island, for a distance of three quarters of a mile.

Soundings.—On the north-west side of Fuerteventura island, the bank to the 100 fathom line, extends about 4 miles off shore.

Jandia point, the south-western extremity of Jandia peninsula, is a low shelving point, with rocks extending 2 cables from the shore, which should not be approached nearer than one mile.

Griego reef.—A rock, which uncovers at low water, known as Griego reef, lies 6 cables S.W. by W. from Jandia point. A short distance outside the reef the depth is 15 fathoms, and between it and the shore there are three fathoms.

In the vicinity of Griego reef the current forms whirlpools.

Pesebre point.—This point forms the north-west extreme of Jandia peninsula, and is foul for half a mile from the shore; it lies 2¾ miles N.E. ¾ N. from Jandia point. The intermediate coast is low, and fronted by flat sandy beaches, with numerous off-lying rocks.

Soundings.—At 2½ miles S.W. of Jandia point the depth is 20 fathoms, rocky bottom, and the edge of the bank steep-to. North-westward from Jandia point, lighthouse, the bank to the 100-fathom line extends 5 miles, deepening gradually from 15 fathoms at one mile from the shore, to 30 fathoms at 3 miles, whence the depth suddenly increases to 75 fathoms; and on the meridian of Pesebre point, at a distance of 2¾ miles from the shore, the depth is 25 fathoms, increasing suddenly to 100 fathoms.

LIGHT.—The lighthouse on Jandia point, the south-west extremity of Fuerteventura island, is of conical form, 62 feet high, of a gray colour, and attached to the south side of the keeper's dwelling; it exhibits a white light which revolves *every minute*. It is visible between the bearings of S.S.W. ¾ W., round by south and east to N.W. by W. ⅔ W. The light is elevated 108 feet above high water, and in clear weather should be seen from a distance of 15 miles.

Bocayna strait, the channel between Fuerteventura and Lanzarote islands, navigable for vessels of any size, is 7 miles in length; and at its narrowest part, between Lobos island and the south extreme of Lanzarote island, 4½ miles broad.

Soundings.—Midway between Gorda and Pechiguera points, the western limits of Bocayna strait, and half a mile east of the 100 fathom line, the depth is 65 and 76 fathoms, fine sand, whence it shoals gradually to Gorda point, but towards Pechiguera point the bottom is even, there being 64 fathoms within half a mile of the shore; on the parallel of Pechiguera lighthouse the 100 fathom line approaches to within 5 cables of the shore. In the eastern part of Bocayna strait the water gradually shoals to 20 fathoms between Martino and Papagayo points, and one mile further east the depth suddenly increases to more than 200 fathoms.

LOBOS ISLAND.—This island, about 5 miles in circuit, is situated one mile off the north-east extreme of Fuerteventura island, with a narrow passage of 6 fathoms between them. The island is without fresh water, surrounded by rocks, and its summit is 360 feet above the sea.

Martino point, the north-east extreme of Lobos island, has rocks extending 3 cables from the shore to the north-eastward; from it Papagayo point, the south extreme of Lanzarote island, bears N.E. ½ N., distant 4½ miles.

LIGHT.—A conical tower 21 feet high, of a dark yellow colour, stands on the summit of Cerro Martino, immediately above the point of the same name; it exhibits from an elevation of 95 feet above high water a *fixed red* light, visible over Bocayna strait between the bearings of E. by S. ⅓ S. through south and west to N. by E. ⅓ E., and in clear weather should be seen from a distance of 9 miles.

Anchorage.—Safe anchorage may be had during the north-east trade wind under shelter of Lobos island in 6 fathoms, sandy bottom, by bringing its south-east extreme to bear N.E. by N., and Gorda point, in line with the next point south-east of it, bearing N.W. ½ N.

Port Cabras.—Midway between Lobos island and Lantailla point, on the east side of Fuerteventura island, is situated an open bay, named port Cabras, the coast of which recedes about one mile; it has a moderate depth of water in it (12 to 20 fathoms, sand and shells), and is the principal trading port in the island.

The shores of this bay are clear of dangers, and the two peaks which form the southern termination of the plateau extending from Mount Muda, afford good marks for recognition from the offing.

Lantailla point, the south-east extreme of Fuerteventura island, lies in a general direction S.W. by S., distant 32 miles from Lobos island;

it is the nearest part of the Canary archipelago to the African shore, from which it is distant 55 miles. From the point, cape Juby bears S.E. by E. distant 58 miles, and Morro Jable point, the south extreme of Jandia peninsula, bears W. ¾ S. distant 24 miles.

Port Tarrajal.—From Lantailla point the coast is nearly straight for 15 miles in the direction of W. ½ N. to the sandy neck of Jandia peninsula; 4 miles westward of the point there is a trading place named port Tarrajal, but the anchorage off it is not recommended.

Morro Jable point, the south extreme of Jandia peninsula, is a low sandy point, from which Jandia point bears N.W. by W. ½ W. distant 9¾ miles.

Caution.—Vessels passing Morro Jable point at night, should not bring Jandia light to bear westward of N.W. ½ W., or get into soundings until the point is rounded.

Soundings.—On the east side of Fuerteventura island, abreast of Lobos island, the 100 fathom line is 2 miles from the shore, and follows the coast at that distance for 20 miles to the southward, whence it gradually increases its distance to Lantailla point, 4 miles off which, in a south-east direction, the depth is 50 fathoms; proceeding westward from Lantailla point, the 100 fathom line approaches to 1½ miles from the shore at the commencement of the sandy neck, whence until near Morro Jable point, that distance is maintained. Morro Jable point is steep-to, the edge of the bank being only one mile off shore, whence to Jandia point it follows the coast at that distance, with regular soundings over it to within 3 cables of the shore, where the depth is about 10 fathoms.

LANZAROTE ISLAND* lies north-east of Fuerteventura, from which island it is separated by Bocayna strait. The island is 32 miles long in an E.N.E. and W.S.W. direction, and its greatest breadth in a northerly direction from Arrecife is 10 miles. The north side of the island for a distance of 7 miles west of Farion point is composed of perpendicular cliffs, terminating at one mile from the coast in Monte Famara, the highest mountain in the island, 2,244 feet above the sea, whence a sandy desert, 10 miles in length and 3 miles broad, extends to the volcanic peaks which occupy the remainder of the island.

Coast.—The west side of the island is principally high and cliffy; the coast on the east side is much lower.

Supplies.—The wine of Lanzorote is sometimes considered superior to that of the other islands of the group. Water is generally scarce.

Pechiguera point, the south-west extreme of Lanzarote island, is a cliffy point with a few rocks at its base. One mile north-east of the point is situated a conspicuous hill (mount Roja) 680 feet high. From the point, Papagayo point bears S.E. by E. distant 4½ miles; the intermediate coast is rocky and recedes about a mile, forming the northern shore of Bocayna strait.

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* *See* Admiralty chart:—Lanzarote island, No. 1,852.

LIGHT.—From a conical lighthouse on Pechiguera point, 31 feet high, is exhibited from an elevation of 51 feet above the sea a *fixed* white light, which in clear weather should be seen for a distance of 12 miles, over an arc of 223°.

Papagayo point, the south extreme of Lanzarote island, is a comparatively low red bluff, with shoals extending a short distance from its south extremity.

Penedo bay, on the north-west coast of Lanzarote, situated 5 miles south-west of the north extreme of the island, is a deep indentation completely exposed to N.W. winds.

Farion point.—This point, the north extreme of Lanzarote island, is low and rocky, projecting nearly half a mile from the base of the cliffs under Monte Carona, which is 1,940 feet above the sea, and the northern extinct volcano on the island. The point should not be approached nearer than one cable.

At the extremity of Farion point there are two remarkable pinnacle rocks.

Orsola reef.—The north-east extreme of Lanzarote island, between Farion and Mojon Blanco points, a distance of 3½ miles, is foul; and midway, extending a distance of 3 cables from the shore, lies Orsola reef, with 3 fathoms a short distance outside it.

Coast.—From Mojon Blanco point, the coast trends S.S.W. in a direct line for a distance of 3 miles to Mugeres point, a mile north of which is situated a low white projection known as Usaje point.

Arrieta bay is situated between Mugeres and Pasito points. At the head of this bay is situated the village of Arrieta, to the southward of which temporary anchorage can be obtained in 11 to 15 fathoms water, at about three-quarters of a mile from the shore; it is, however, completely exposed to easterly winds.

Coast.—From Pasito point the coast, fringed by rocks, extends in a S.S.W. direction for 4 miles, and then S.W. for 5 miles to port Naos.

Port Naos.*—On the east side of Lanzarote, midway between its extremities, is situated port Naos, the only harbour in the island; it is small, but secure, being formed by Cruces island and some rocky islets; it has two entrances, of which the southern between Cruces and Francisca islands, having in it a depth of 12 feet at low water, is the principal; the town of Arrecife lies about half a mile west of the anchorage.

Large vessels anchor off port Naos in 18 or 21 fathoms, on the parallel of the three windmills situated on a height close eastward of the town.

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* *See* plan:—Port Naos, on Admiralty chart, No. 1,852; scale, *m* = 2 inches.

Tides.—It is high water, full and change, in port Naos at 1 h.; springs rise about 9 feet.

LIGHTS.—On the point west of Cruces island in port Naos, are two lighthouses, each 20 feet high and each exhibiting a *fixed red* light. The lower light is 50 yards from the shore, 35 feet above the level of the sea, and visible in clear weather from a distance of 6 miles. The upper light is about 125 yards farther inland, 47 feet high, and visible from a distance of 7 miles.

Directions.—The lights in line, bearing N.N.W. ¾ W., lead through the south entrance to port Naos, but the channel is narrow, and should not be taken by a stranger without a pilot.

Fisheries.—The fishery on the adjacent coast of Africa is principally carried on from Arrecife, and a large number of the inhabitants are engaged in it.

Port Arrecife.—Southward of the town of Arrecife is a small sheltered space protected by Quemado islet; it is however only available for very small coasting vessels.

Large vessels anchor in from 17 to 30 fathoms in the roadstead south of Queimado islet; this anchorage is however completely exposed to southerly winds.

Coast.—From port Arrecife the coast trends in a westerly direction for 5 miles, and then forms a bight, the western portion of which is known as Avila bay, where temporary anchorage may be obtained in from 7 to 16 fathoms.

At the eastern part of this bight is situated the village of Tiñosa. A reef, known by the same name, lies near the shore about a mile eastward of this village.

From Gordo point, the west point of Avila bay, to Papagayo point, the coast is clean and tolerably straight.

East rock.—At 6 miles off the north-east extreme of Lanzarote island there is a small islet named East rock, barren, with a craggy summit, and with deep water all around except on its south-east side, where rocks extend off some little distance; the 100-fathom line approaches within 1½ miles of the south-east side of East rock. From the rock, Farion point bears W. ¼ N. distant 7⅓ miles, and Delgada point lighthouse (Allegranza island) N.N.W. ¼ W. distant 11 miles.

Rio strait.*—The passage between Graciosa and Lanzarote islands is 4 miles in length, in an E.N.E. and W.S.W. direction. In the narrowest part, between the salt works on Lanzarote and the shore of Graciosa, the breadth is half a mile, and the depth in mid-channel 4½ fathoms; to the eastward, the soundings deepen to 14 and 19 fathoms between Farion and Pedrobarbo points, the eastern entrance points of the strait; but to the westward the north shore should be kept on board to avoid shoals of 3 and 2¾ fathoms, until Monte Famara is open west of Ginate point bearing S. by W. ¾ W.

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* *See* plan :—Rio strait, on Admiralty chart, No. 1,852; scale, $m = 2$ inches.

Anchorage.—Secure anchorage for large vessels may be obtained in Rio strait, if desirous of refitting rigging or making repairs, but there is no good water or supplies of any kind to be obtained.

Winds.—The prevailing winds in Rio strait are from North and N.N.E.; occasionally the trade-wind draws through from E.N.E. or towards S.E., when the gusts from the south shore are strong. In winter S.W. winds sometimes blow with great strength.

GRACIOSA ISLAND.—This island lies off the north extreme of Lanzarote, being separated from it by Rio strait. The island is 4¾ miles long in an E.N.E. and W.S.W. direction and 2 miles wide, its summit being 873 feet high.

Coast.—The shores of the island are of moderate height, and generally fringed with rocks for a short distance.

Montaña Clara island.—The north extreme of the Lanzarote group is formed by this island; it lies one mile northward of Graciosa island, with a clear channel of 10 to 12 fathoms between. The island is about 2 miles in circuit, its north extreme is cliffy and bold, the south-west extremity low and shelving, with foul ground extending 2 cables from it.

Infierno or West rock.—At half a mile north-east of Montaña Clara, and nearly connected with it by rocks, is the summit of a volcanic mountain, 20 feet above the sea, named Infierno rock, which has foul ground to the westward of it for a distance of half a mile.

ALLEGRANZA ISLAND.—This island is the northern of the Canary group; it is the remains of an extinct volcano, elevated 940 feet above the sea, nearly round, 6 miles in circuit, and separated from Montaña Clara island by a clear channel 4 miles wide, with an average depth of 35 fathoms.

Allegranza island is uninhabited, and only occasionally visited by the inhabitants of Lanzarote for the purpose of collecting orchilla.

Trabuco point, the south extreme of Allegranza island bears from Infierno rock N.E. by N. distant 4½ miles.

Coast.—The west side of the island is composed of precipitous cliffs, 700 feet high and steep-to; the remainder of the coast is lower and fronted by rocks.

Landing Place.—The best landing-place is in a cavern on the south side of the island.

LIGHT.—The lighthouse on Delgada point, on the east side of Allegranza island, is a conical dark gray tower 49 feet high. It stands about 240 yards within the extremity of the point, and exhibits from an elevation of 57 feet above the sea a *revolving* white light, which attains its greatest brilliancy *every half minute*, and in clear weather should be seen from a distance of 13 miles. The light is visible over an arc of 270°, or when bearing from S.S.E. ¼ E. round by west and north to N.E. by E. ¾ E.

Soundings.—On the west side of Allegranza island the bank of soundings to the 100-fathom line extends only three quarters of a mile, and about 2 miles in a westerly direction from Montaña Clara. On the north side of Allegranza island there is a depth of 30 fathoms at one mile from the shore, while to the eastward, on the parallel of Delgada lighthouse, there are 50 fathoms at 2 miles, the depth increasing gradually to 108 fathoms at 10 miles from the shore, whence to the south-westward the 100-fathom line is found at 1½ miles south-east of East rock ; it approaches the shore of Lanzarote island to 4 cables at 5 miles north of port Naos ; and again recedes to 3 miles in a southerly direction from port Arrecife ; off Papagayo point it approaches the coast to a distance of 2 miles.

CHAPTER V.

CAPE BOJADOR TO RIVER GAMBIA.

VARIATION in 1880.

Cape Verde - - - 19° 05′ W.

CAPE BOJADOR.*—When seen from the northward cape Bojador shows a strand of red sand, and has a gradual descent towards the sea, its western extremity, which is very low, forms a small bay with the cliff which adjoins. The eastern part of this cliff is the most remarkable and about 70 feet high. The surf is exceedingly heavy all along this coast, but there is a small recess in the shore east of the cape, in which there is 9 fathoms and smooth water.

Current.—At 4 miles W.N.W. from cape Bojador the current has been observed to set S.W. with a velocity of 1¼ knots an hour.

Tides.—It is high water, full and change, at cape Bojador at noon; springs rise about 8 feet.

Coast.—From cape Bojador the coast trends about S.W. ½ S. for a distance of 64 miles, to a remarkable cliff, named Peñha Grandé. Its height, about 300 feet, so far exceeds that of any other portion of this coast, that it serves as a good landmark. The general character of the shore thus far is alternate cliffs and sandy beaches, the former being the most extensive, and from 150 to 200 feet in height, with flat summits. The country in the interior has a dark appearance, though brushwood seems to be scarce.

Soundings.—The depth of water at a moderate distance from this part of the coast is considerable; at 2 miles from the beach, bottom cannot be found at 22 fathoms; at a mile from the foot of Peñha Grandé cliff there are 26 fathoms, gravel and broken shells; and it is everywhere safe to approach and clean up to the beach.

Garnet bay.—At 14 miles S.W. from Peñha Grandé there is a projecting cliff, which has received the name of Garnet head, to the southward of it the coast recedes and forms Garnet bay, which does not afford any shelter.

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* *See* Admiralty chart:—Africa, West coast, Sheet iv., Cape Bojador to cape Blanco, No. 1,230.

Anchorage.—H.M.S. *Leven* found clean anchorage in 15 fathoms off Leven head, 23 miles south-west of Garnet head.

Deception cliff.—An almost straight line of low cliffs, 35 miles in length, extends from Leven head to Elbow point, with a depth of 11 to 14 fathoms at 5 miles from the shore. In lat. 24° N. a white sandy beach about 3 miles in length interrupts this line of cliffs, and, about 6 miles south of this beach, an irregular mount of rock and sand will be seen on the shore. It lies in lat. 23° 54′ N., and received the name of Deception cliff, from its having assumed, till close in, the appearance of an island.

Ouro river.*—Immediately southward of Deception cliff, the basin at the mouth of the river Ouro may be seen over the low isthmus, as well as over part of the peninsula which separates it from the sea; this peninsula is about 20 miles in length, terminating in lat. 23° 26′ N. at Durnford point.

The basin of the river Ouro was partially examined in May 1821, by H.M.S. *Leven*, which vessel crossed the bar, and anchored about 7 miles within it. Although the entrance is 4 miles wide, it is nearly blocked by a sandbank, which extends from the main, and by several rocky dangers with not more than 10 feet water upon them. The navigable part of the channel is about half a mile wide, and lies on the northern side of the entrance. The bar, situated about 1¾ miles east of Durnford point and south of a long sandy spit projecting to the eastward from the peninsula, has not less than 12 feet on it at low water; after crossing the bar, the channel rapidly increases in depth as well as in breadth, and expands into a fine basin with a clean bottom, about two miles across from bank to bank, and 7 or 8 miles in length, before it again shallows. The surrounding land presented no objects from which a leading mark for the bar could be obtained; and it would not be safe for any vessel to attempt the entrance without a pilot or previously buoying it.

Landing.—A good landing-place was found close to the northward of the above-mentioned sandy spit, in a cove which affords good shelter to boats, and abundance of fish, although a heavy surf rolls across its entrance.

Outer anchorage.—There is tolerable anchorage outside the bar in 5 fathoms, but Durnford point should not be brought to bear westward of N.N.W., as the sea was observed to break in many places further to the eastward, and none of those reefs were examined.

Herne island is situated near the north extremity of this extensive basin, and lies 18 miles N.E. by E. from the bar; it is surrounded by banks which dry at low water, and which seem to be connected with the banks at the mouth of the river Ouro; but whether this is really a river or merely the continuation of this singular opening has not yet been ascertained; scarcely any stream, however, was perceived to issue from its mouth, which was more than a mile wide.

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* *See* Admiralty plan:—River Ouro, No. 605; scale $m = 0{\cdot}4$ inches.

Tides.—It is high water, full and change, in Ouro river at noon; springs rise 8 or 9 feet. Off the entrance the flood stream sets nearly east, and the ebb west, with a velocity of about 2 knots an hour. Inside the bar, the tidal stream runs at the rate of 2½ knots an hour. Over the bar and the shoals it sets with great velocity, and causes a high break, which affords an unerring beacon to the shoalest portions. There appear to be three or four of these sandy bars or ridges, thrown up by the action of the tidal streams; they extend nearly to Fisherman point, distant 8 miles S. ¾ W. from Durnford point.

Fish.—It may be remarked that there is abundance of fine fish all along the coast from cape Bojador to Durnford point, as well as in the Ouro basin.

Angra de Cintra bay.—From Fisherman point the coast trends S.W. ½ W. to latitude 23° 6′ N.; the northern 13 miles being cliffs, along the base of which, to the distance of 3 or 4 miles from the shore, extends a bank with 5 fathoms on its outer edge, and 12 fathoms close to it. From the summit of the cliffs, white sandy downs with flat summits extend inland, one of which, at the distance of 8 or 9 miles from the southern termination of the cliffs, appearing somewhat elevated above the rest, and having its southern extremity peaked, is remarkable; it is situated at a short distance from the beach in the bay of Angra de Cintra. From the north entrance point of this bay a reef extends south-west about 2 miles, the point itself being low and sandy. The south entrance point of the bay is in latitude 22° 58′ N., and from it also a reef projects a considerable distance to the north-east. The break in the coast between these reefs, which forms the opening into the bay, is about 7 miles wide; and from the northern reef, the bay extends about 4 miles in a N.N.E. direction. Midway between the two reefs at the entrance there are only 4½ fathoms, sandy bottom; and a little further to the south-east of this position there is a detached shoal. The opening seems otherwise safe, there being 7, 8, and 9 fathoms in the rest of the space. The bay is apparently shallow, but abounds with fish, as does the whole bank between the river Ouro and this bay.

Fishery.—Fishing vessels belonging to the Canary islands are found in this vicinity; they salt and cure fish for the supply of those islands, and it is stated that at the foot of the high down above mentioned, good water may be obtained by digging in the sand.

Rollers.—During the time of rollers, the sea breaks very heavily along this part of the coast, and in winter it breaks in several places across the opening into Angra de Cintra bay.

Cintra hills.—About 10 miles southward of Angra de Cintra bay, and a few miles inland, there are three or four small isolated sandy downs, named Cintra hills; they are rather higher than the adjacent ground, and may serve as a mark by which to find the bay, but cannot be seen further than 10 or 15 miles.

St. Cyprian bay.—From Angra de Cintra bay, the coast trends S.W. by S. for a distance of 21 miles; it is low near the shore, but gradually rises and becomes a continuous plain of white sand. The coast at a distance of 21 miles from Angra de Cintra bay trends S.W. by W. for 17 miles, presenting alternately cliffs and sandy beaches as far as St. Cyprian bay. The eastern point of this bay is a cliff 150 feet high, which has a circular form towards the sea, and a flat summit somewhat resembling a fortification. It is bounded on the west side also by a steep cliff, which, after extending 2½ miles to the westward, turns abruptly to the southwestward, and forms cape Barbas, at a distance of 55 miles S.W. ¾ W. from the north entrance point of Angra de Cintra bay.

Unsafe anchorage.—Baron de Roussin, who named St. Cyprian bay the bay of Tribulation, from the danger to which his vessels were exposed during the five days they were occupied in its examination, observes that being open from N.E. to W.N.W., it is therefore unsheltered from the prevailing winds and the heavy swell that they roll in; and the anchorage, though on a bottom of sand and mud in 10 to 20 fathoms, offering very little security, no vessels should venture in but in cases of absolute necessity. The multitude of fish, however, which are found there, attracts the Canary fishermen, who, with the hope of being quickly laden, and the appearance of moderate weather, frequently anchor too close in; where, if the wind suddenly freshens, they are equally incapable of beating out of the bay with their crazy vessels, or of riding out the gale with their ill-found ground tackle. They are, therefore, sure to drive, and to be thrown upon the beach, where they are equally sure of being plundered, stripped, and thrown into slavery by the Moors. These Moors appear to be mere wanderers of the desert, and to have no fixed habitation. They are said to be outcasts from the other tribes, and to be scattered along the coast from cape Bojador to Senegal river.

Anchorage.—H.M.S. *Leven* anchored off cape Barbas in 19 fathoms, fine green sand, the cape bearing S.S.W., distant 4 miles.

Coast.—From cape Barbas to Galha point which bears from it S.W. by W. ½ W., distant 9 miles, the coast is an uninterrupted cliff of about 80 feet in height; there is a depth of 12 fathoms at a mile off shore, and at a distance of 2 miles, there are 17 fathoms, on a bottom of muddy sand and broken shells; the coast near Galha point is formed by the usual sandy plans with a few cliffs; southward of the point it recedes and forms a shallow bay full of reefs, with an outlying and dangerous rock off both its northern and southern entrance points.

Pedra de Galha rock.—The northernmost of these rocks is named Pedra de Galha, and it lies about 2 miles W. by N. from Galha point; it is rather higher on the northern than on the southern side, and about half a mile in circumference.

Virginie rock lies 3 miles off shore, and about the same distance S.S.W. from Pedra de Galha rock, of which it is about three times the size. These rocks are in some measure connected by a chain of flats which extend a mile northward of Pedra de Galha, and half a mile southward of Virginie rock. At a mile westward of these rocks, 18 fathoms will be found on muddy sand; and as the depth increases to the southward, the bottom becomes harder.

Coast.—From Virginie rock cape Corveiro bears S.S.W. ¾ W. distant 23 miles, and S.S.W. ½ W. 57 miles further is situated the shoulder of cape Blanco. The intermediate coast is moderately high and nearly straight, with but few trifling indentations. As far as cape Corveiro it is one continued stretch of white sand, rising in some places into peaked hills, in others gently sloping to the sea, with here and there a few cliffs, and the whole without the least appearance of vegetation.

Cape Corveiro.—At the south side of a sandy beach 5 or 6 miles long, at the head of a slight indentation named St. Ann bay, the irregular summit of one of these cliffs forms a striking contrast with the uniform smoothness of the adjoining coast. It is about 5 miles in length, and its most salient point, though not very well defined, is named cape Corveiro, the latitude of which is 21° 47′ N. A muddy bottom is found near the cape, and all this part of the coast is perfectly safe of approach. The strength of the current along the shore is nearly a knot an hour, but further seaward it is much less.

CAPE BLANCO.—Southward of cape Corveiro the coast consists of white and red sandy slopes, assuming various shapes, alternately terminating at the water's edge in broken cliffs, or in low sandy beaches, on which there is a heavy surf. In running along the coast, at 25 miles northward of cape Blanco, Levrier bay is seen over the isthmus which connects that cape with the mainland; and at 5 miles N. by W. ½ W. from cape Blanco, there is a high sandy shoulder projecting from the line of coast, which has often been mistaken for the cape.

Cape Blanco is a perpendicular white cliff, not more than 75 or 80 feet above the level of the sea; it is composed of strata of calcareous grit of varying hardness, and its surface is quite barren. It presents a sea front of about a quarter of a mile long, which lies nearly east and west, with a beach extending to the eastward of the cliff for a distance of a cable, and which is so steep, that at 50 yards from it there are 7 fathoms water. From the western extreme of the cape a shoal spit projects to the south-westward about a quarter of a mile, with 3 fathoms on its extremity and two detached shoals of 3½ and 4 fathoms extend 3 cables S.S.W. of the same point.*

West bay is formed by cape Blanco and the sandy shoulder 5 miles N. by W. ½ W. from it. The shore consists of a broad beach of white sand interspersed with cliffs; through one of these cliffs the sea has perforated a large hole, which may be seen at some distance, especially when approaching from the westward. The anchorage in West bay (as well as on the whole coast from cape Corveiro) is clean; muddy sand is found throughout, with a depth from 12 to 19 fathoms at about a mile from the shore; and large vessels may proceed so far in as to be sheltered from a N.W. wind.

Levrier bay.†—The long promontory of cape Blanco forms the western side of the extensive bay of Levrier, which is 25 miles long from north to south, and nearly 20 miles wide at the entrance. The anchorage ground in this bay is much restricted by an extensive bank and detached shoals, which extend from the eastern side.

The western side of Levrier bay is indented by Repose bay and a small shoal bay, situated 7 miles northward of it, known as Star bay; the head of the bay is named Archimedes bay.

The coast on the eastern side of Levrier bay is low, with a few sand hills upon it; it is fronted by a shoal bank, which to a depth of 3 fathoms, extends generally about 3 miles from the coast with numerous off-lying dangers, which in the southern part of the bay are found at 7 miles from the eastern shore.

Repose bay.—Cansado point, the south entrance point of Repose bay, is situated 4½ miles N.N.E. ¾ E. from cape Blanco, and Flore point, its northern limit, is 4 miles further, in nearly the same direction. The bay, which is about 2 miles deep, has from 5 to 2 fathoms water in it, but affords very little shelter from N.E. winds, which blow here with great violence, and are loaded with minute sand, which is most injurious to the eyes. The *Ætna* rode very uneasily in this bay, and parted one of her chain cables; even with a light breeze there is a troublesome sea, and it did not appear that on the eastern side of cape Blanco there was any convenient anchorage.

Winds.—Repose bay is sheltered from N.W. and N.N.W. winds, should they blow, but the Canary fishermen who frequent this anchorage assert that N.N.E. and N.E. winds constantly prevail, and that those winds, and the sea therewith, are considerably heavier than is experienced when west of the cape, and therefore, though there is certainly anchorage in Levrier bay for vessels of any size, yet they are recommended to take up the outside anchorage in West bay, where the Canary fishermen resort, in preference to that found to the eastward of the cape. There is less swell there, abundance of fish to be taken by the hook, and little chance of losing an anchor; also should a strong westerly breeze set in, they will still have the option of going inside for shelter.

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* Commander E. Belcher, H.M.S. *Ætna*, 1831.

† *See* Admiralty plan.—Levrier bay and cape Blanco, No. 1,699; scale, *m*=2 inches.

Levrier banks.—One of the great banks which obstruct the eastern side of Levrier bay, approaches cape Blanco within 1½ miles on the bearing of East from the cape, it has only 2½ fathoms on its edge, but there is a safe channel of 7 to 16 fathoms, between it and the steep beach of the cape.

Directions.—To make cape Blanco, run down the latitude of 20° 52′ N., on which parallel the shore may be approached to the depth of 15 fathoms in the thickest weather. When in that depth, the land should be visible; the surf may be heard at a distance of 1½ miles from the shore. If the weather is very thick, anchor; but if the cape be seen, steer so as to pass it at a mile distant, in order to avoid the long spit, with 3 fathoms at its extremity, which runs off to the south-westward. When the eastern angle of the cliff, the upper part of which overhangs like an open mouth, comes fairly in sight, haul in towards the steep sandy beach; it may be given a berth of about 2 cables, but be careful not to approach it so near as 7 fathoms water; the depth of 12 fathoms is a prudent distance. Should the wind hang north-easterly, and a board to the eastward become necessary, tack in again as soon as there is sufficient room, and upon no consideration decrease the depth of water in standing to the eastward to 9 fathoms, as the next cast will probably be 2½ fathoms. With a foul wind it would be prudent to anchor outside, and wait until the flood tide has made. A short board then will carry a vessel to the anchorage, which, with a flood tide running, should be taken as soon as the west point of the cape is well shut in, and the eastern cliff again shows the appearance of an open mouth. The best anchorage will be in 10 or 12 fathoms, about three-quarters of a mile north-east of the cape, but no mud will be found south of Cansado point, off which an advantageous berth may be taken in 8 fathoms.

Working to windward.—To beat up to cape Blanco from the southward against the prevailing N.E. winds, Commander Belcher recommends standing off on the starboard tack during the flood, and in-shore with the ebb, because the ebb stream in the offing sets northerly, and when closing the land, will be rather on the lee-bow. Do not, however, stand in after the last quarter ebb, unless it be the intention to drop an anchor, for with light winds a dull sailing vessel will not stem the tide and current. Whenever cape Blanco can be brought to bear E.S.E., stand boldly in towards the land, but if bound to the inner anchorage, do not attempt to round the cape against an ebb tide, for unless the breeze be strong from the westward, few vessels could get beyond the steep sandy beach. It is better under such circumstances to anchor on the west side of the cape.

Bayadere banks lie off the pitch of cape Blanco; they were not minutely examined, but seemed to be extensive, and though the least water found on them was 4½ fathoms, yet heavy overfalls were plainly seen during the ebb tide. The directions given above for rounding the cape leads well clear of them to the northward.

Tides.—The tides about cape Blanco are irregular, and their direction is much influenced by the form of the land. It is high water full and change in Levrier bay at noon; springs rise 6 feet. At the *Ætna's* position between the cape and Levrier bank, the course of the flood stream was N.E. by N., and the ebb S.W. by S., with a velocity of 1½ to 1¾ knots an hour. At 2 miles east of the vessel, the streams ran N.N.E. and S.S.W.; and at 1½ miles southward of the cape, the flood ran S.E. and the ebb W.S.W. at the rate of 2½ knots an hour. Off the coast northward of the cape, the flood stream sets south, and the ebb north; and close inshore, the stream is considerably weaker than at 3 miles distant from the land.

Currents.—Along the western coast of Arguin during the fine season the current sets constantly to the southward, and even during the rainy season the exceptions to this rule are rare. In July 1830 the wreck of the French frigate *La Meduse*, drifted 90 miles in thirteen days, and was found at 45 miles from the shore, nearly on the meridian of the place where she was lost.

Coast.—Cape St. Ann lying S.E. ½ E. from cape Blanco, distant 22 miles, is a low plateau about 25 feet high, the land in the vicinity is marshy.

From cape St. Ann the coast extends 10 miles to the southward, and at that distance forms Arguin point, which is the dividing point between Levrier bay and the deep bay in which is situated Arguin island; the land in the vicinity is low.

Arguin island, formerly an important Portuguese and Dutch trading post, is now abandoned; it is the easternmost and largest of a group of islands occupying the middle of the bay east of Arguin point, and is entirely surrounded by a bank of sand.

Arguin bank.*—The bank of Arguin may be described as a continuation of the broad shoal which occupies the eastern side of Levrier bay, and to extend from thence to the southward of cape Mirik, a distance of about

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* *See* Admiralty chart—Africa, West coast, Sheet v., Cape Blanco to cape Verde, No. 1,231.

90 miles, its extreme breadth being about 40 miles, and its western elbow lying in long. 17° 10′ W. The bottom on this bank is apparently a flat and very hard sand, but generally covered with broken shells.

No vessel can approach Arguin bank to a less depth than 7 fathoms without risk, as at a very short distance to the eastward of this there is shoal water. The general direction of the edge of the bank to the northward of lat. 20° 0′ N. is S.W. by S., and to the southward of that parallel about S. by E. to cape Mirik. No part of the edge of the bank has been seen dry, but close to the breakers which occur in many places there are but a few feet water, and the shoals between them do not appear to carry more than 10 feet.

Soundings.—In approaching from seaward, when to the northward of 20° 0′ N., the soundings gradually decrease to the edge of the bank from about 30 miles to the westward, where 40 fathoms will be found. To the southward of this parallel the bottom becomes more uneven, and from the spot where *La Meduse* was wrecked, in 19° 53′ 42″ N., and 17° 1′ W., a still great irregularity takes place in the depth. The nature of the bottom westward of the bank of Arguin observes a remarkable law, which will be of some service to navigators who are obliged to approach it. From the 7-fathoms edge of the bank, out to the depth of 25 fathoms, and thus including a belt of more than 15 miles in breadth, the lead invariably brings up a mixture of sand and broken shells, and in proportion to the proximity of the bank shells prevail; beyond the depth of 25 fathoms and as far as that of 50 fathoms the bottom is entirely of white sand. Hence it is evident that by the soundings and by a rough observation for latitude a vessel may always know her distance from Arguin bank. For example, should a vessel in latitude 20° 20′ N. find 23 fathoms with sand and broken shells, it may safely be inferred that the dangerous edge of the bank is not more than 22 miles to the eastward, and likewise that cape Blanco bears about N.E. by E. ¼ E., distant 28 miles.

Caution.—To the northward of 20° 20′ N. this law is uniform, but to the southward of that parallel it is subject to some exceptions, and the best advice to give the seaman is to keep the lead going, and not to shoal the water to less than 25 fathoms; as the bank south of lat. 20° N. takes a direction of S. by E., it becomes no longer dangerous if a vessel is kept on a wind in 20 to 25 fathoms, and sounds frequently. In any case, however, the mariner is recommended to pay strict attention to frequent sounding, as it is indispensable while in the neighbourhood of this extensive and dangerous bank.

Commander Belcher seems to have some doubt of the strict uniformity of the remarkable and apparently useful law, above quoted from M. de Roussin's work, but observes that, "Whether this remarkable

" distinction in the *quality* of the soundings be correct or not, the *depths* " will be sure guides, and unless actually bound to cape Blanco no vessel " has any business within 15 fathoms by day, and 25 by night, especially to " the southward of 20° 0′ N. Vessels in the vicinity of this bank should " frequently feel for the bottom with 40 or 50 fathoms of line."

The *Ætna*, standing in towards the bank near the place where *La Meduse* was wrecked, suddenly shoaled to 7 fathoms ; and in standing off found the depth decrease to 5 fathoms, which continued for a quarter of an hour, then it deepened to 16, and as suddenly no bottom was found with 100 fathoms. The current and tide probably set strongly on the bank, as subsequent experience proved they did, so that the vessel scarcely stemmed them, and thus accounted for the long detention in 5 fathoms.

Cape Mirik.—At 89 miles South from cape Blanco, is situated cape Mirik ; it is a very low sandy point near the southern termination of the great bank of Arguin. The intermediate coast, between the low sandy point forming the eastern limit of Arguin bay and cape Mirik, has only been partially examined ; it is everywhere fronted by shoals and sand-banks, which render all approach difficult. At about 20 miles north of cape Mirik there is a group of islands near the shore, the most important of which is known as Tider island.

Tanit bay.—From cape Mirik the coast trends S.S.E. ¾ E. for a distance of 27 miles, where it forms a sudden bend, named Tanit bay. It is all low, and forms a continuous chain of small regular sandy downs, very white, and interspersed with small bushes. A few huts are in some places seen near the beach, and in the dry season numerous parties of the vagrant tribe of Moors before mentioned assemble here to catch and dry fish. Two large sheets of water were observed between the high downs, but whether they were fresh or salt was not ascertained, from fear of collision with those barbarians.

Angel hillocks.—From Tanit bay the general direction of the coast is S. by W. for a distance of 36 miles, some flat sandhills are seen, which are rather higher than the rest of the coast, and have been named Angel hillocks. They are divided into two groups ; the northernmost, which are smaller than the others, are studded with tufts of brushwood, while the eight or nine hummocks of the other group are nearly bare. The southernmost and highest hillock is in lat. 18° 29′ N. Southward of Angel hillocks the shore gradually becomes lower, till it sinks into an uniform line of sand scarcely above the level of the sea, with here and there a bush.

Caution.—No part of this coast from cape Mirik, should be approached to a less depth than 8 fathoms ; by attending to which rule all dangers will be avoided, and amongst others the Angel bank, a shoal flat which extends 7 miles from the beach, abreast of Angel hillocks. This flat affords, however, a convenient anchorage for small vessels.

Landmark.—At 12 miles southward of Angel hillocks, and a little within, and higher than the beach, there is a stunted palm, the only one seen in the long interval of coast between cape Bojador and Senegal river.

Portendick.*—About 2 miles southward of the above palm tree is the site of Portendick, one of the places to which, by the treaty of 1783 with France, the English gum trade was confined. The coast is a continuous line of sand, with a few hillocks and some scattered bushes, but all so low that nothing can be seen even in the clearest weather at a greater distance than 9 miles. No vestige could be found of the former settlement, and the huts, which were hastily constructed by the Moors, consisted of loose bushes only, and were not more than 4 feet high; they answer, however, the temporary purposes of the traders who bring down gum, or of the fishermen who find here an abundant harvest.†

Roadstead.—The roadstead is west of a small projection of the beach, and between two banks of sand and shells, one mile apart, both lying in a N.N.W. and S.S.E. direction, with from 1¾ to 2¾ fathoms water on them. The northernmost, or inner bank, is more than a mile long, its south extreme bearing S.W., distant 3 cables from the point near the landing-place, where the Moors generally erect their huts, and there is a knoll of 10 feet, one cable W. by N. from the same point, with 3½ fathoms inside it. The northern extreme of this bank is reported to be situated considerably farther to the northward than is shown on the Admiralty chart. About 1¼ miles W. by S. from the landing-place on the projecting point of beach, lies the north extreme of the outer bank, which extends from thence S.S.E. for about 2 miles. The depths in the roadstead are from 4 to 5 fathoms on sand and shells, and vessels may anchor where most convenient, according to circumstances; vessels taking in cargo can anchor in 4 fathoms at about a quarter of a mile S.S.W. from the huts, and 2 cables southward of the northern bank. H.M.S. *Britomart* anchored in 5 fathoms, 1¼ miles W. by N. from the landing-place.

Directions.—The stunted palm not being visible at a greater distance than 1½ or 2 miles, vessels proceeding to Portendick from the northward should make the Angel hillocks, and then run along shore in about 6 fathoms, paying careful attention to the lead. Anchorage may be obtained in 4½ or 5 fathoms, at 4 miles from the beach, with the Angel hillocks bearing N.E. by E.; this is a good place at which to anchor if intending to communicate with the natives.

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* *See* Admiralty plan:—Portendick anchorage, No. 606; scale $m = 2{\cdot}5$ inches.

† Lieutenant W. H. Quin, H.M.S. *Britomart*, 1834.

If not sure of the latitude, a vessel wishing to make Portendick should anchor in 6 fathoms.*

The palm tree, which is old, should be made out before the bank is neared too closely.

There is a bush, rather higher than the rest of the coast, at the head of the little bay where the anchorage is, which might catch the eye when approaching; when steering for this bush, bearing S.E. by E. ½ E., there is not less than 4½ fathoms, until within 1½ cables of the shore.

The coast is so low about Portendick that it cannot be distinguished when in 7 fathoms.

Tides.—It is high water, full and change, at Portendick at 10h.; springs rise 6 feet.

Coast.—From Portendick the general trend of the coast is S.S.W. ¾ W., for about 100 miles to the northernmost of the Marigots, or little channels, which carry off the overflowings of Senegal river in the rainy season; this channel is named the Mosquito Marigot, and its mouth is situated in latitude 16° 37′ N. The whole of the coast between Portendick and Mosquito Marigot is low, nearly level, and interspersed with small bushes. Two patches, however, may be perceived of red sand, partly covered with brushwood, but they are only discernible when within 2 miles of the beach; one is situated in latitude 17° 25′ N., the other in 16° 55′ N. From the mast-head some sheets of water were observed at the foot of these elevated patches, and at 6 miles southward of them the interior appears to be partially clothed with brushwood, but the coast remains uniformly barren. At the distance of 2 or 3 miles from the beach there are regular soundings in from 12 to 6 fathoms on a bottom of fine sand, occasionally mixed with mud, and affording a ready anchorage.

Mosquito Marigot.†—Mosquito Marigot is about 36 miles northward of St. Louis. When the rains have swollen Senegal river, the bank at the entrance of this Marigot is covered and may be crossed by boats, but always through a heavy surf.

SENEGAL RIVER.—To the southward of Mosquito Marigot the basin of the Senegal is only separated from the ocean by a narrow tongue of sand, which gradually decreases in height towards its southern extremity, and is named Côte de Barbarie. Within this tongue of sand the divided stream of the Senegal forms a number of small islands, on which a covering of bushes gives the country some appearance of fertility.

Senegal islands.—The names of these islands are Bequio, Gazelles, Bifeche, Griel, and Thiong, which last is connected with the island on which the town of St. Louis is built. Griel island, or, as it is locally termed, le Bois de Griel, contains some trees, the verdure of which offers a singular contrast to the 600 miles of desert northward of them. On either side of this green tuft the stream of the river may be seen from the mast-head over the sandy ridge ; and it is the surest mark for indicating the landing-place to the northward of the bar. Along this part of the coast, vessels may run at the distance of two miles from the beach, in from 12 to 8 fathoms, over a clear bottom of compact green mud, which bottom is found between 15 miles north and the same distance south of St. Louis, on the parallel of which it extends 14 or 15 miles from the shore.

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* Commander F. W. Richards, H.M.S. *Dart*, 1862.

† *See* Admiralty plan:—St. Louis, or Guet n'dar and Senegal bar, No. 1,001; scale, $m = 0{\cdot}9$ inches.

ST. LOUIS.—Southward of Île de Thiong will be seen the French establishment of St. Louis, with its white buildings. The narrow island on which the town stands is little more than a mile in length, and is connected to Île de Sor by a bridge ; the principal passage is on its eastern side, and the western channel is so narrow, and its western bank so low, that from the offing the town appears to stand on the sea-shore.

Population.—The population of St. Louis in 1872 was 15,650.

LIGHT.—There is a small fixed light shown from the Government house on Île de St. Louis, visible 6 miles, and from a signal-staff at the same place the depth of water on the bar is signalled.

Climate.—The temperature ranges between 52° F. (about the mean minimum in January) to a maximum of 95° F. in the summer months.

During the prevalence of easterly winds in the dry season a difference of 36° is often experienced between the night and day temperatures.

Guet-n'-dar.—To the westward of St. Louis stands the village of Guet-n'-dar, defended by a battery, and from whence a canoe is immediately launched on the approach of a vessel.

Anchorage.—The anchorage off the bar of Senegal river should be taken, according to the time of the year, in 9 or 11 fathoms, or in other words, at 2 or 5 miles from the bar. At all seasons a long swell prevails at this anchorage. Vessels also anchor abreast Guet-n'-dar in 9 to 10 fathoms, mud, about 2 miles from the shore with the Government house at St. Louis bearing about S.E.

Approaching from northward.—The mouth of Senegal river is not easily recognised when coming from the northward ; the heavy surf which prevails upon the whole coast, and which breaks along Côte de Barbarie, prevents the surf on the bar from being distinguished, and vessels might pass without seeing it, if they should keep at too great a distance from the shore. But from abreast of Guet-n'-dar they may safely run along it at the offing of a mile, and at that distance everything will be distinct. The cocoa-nut trees and square guard house on Île de Babagué will be seen in passing. As the wind generally hangs to the northward, it is advisable to take a berth well northward of the bar, for the greater facility of communication with the shore.

The sandhills north of St. Louis are rather higher than those to the southward, and at about 8½ miles north of St. Louis there is a conspicuous ruined tower (N'Diago tower) and a large house which appears black.

Approaching from the southward.—In running for the Senegal from the southward, the mouth of the river is more easily perceived than from the northward, as it opens in that direction. At the distance of 35 miles south of St. Louis, and on the parallel of 15° 26′ N., there is a large red sandy elevation (Tiakhmat) visible about 15 miles, which to vessels ignorant of their latitude may serve to indicate their distance to the southward of the bar; when near the shore three palm trees may be seen near this sandhill.

Gandiolle telegraph station (Marché de Gandiolle), 8½ miles south of St. Louis is also rendered conspicuous by a house with red roof and white gables.

At about 12 miles south of St. Louis are situated the five sandhills of Mousseguiob (Dunes de Mousseguiob), which are from 16 to 29 feet high, and on one of which there is a flagstaff.

. **Bar.**—The position of the Senegal bar is not stationary; the right bank of the Senegal below St. Louis is so low as to cover with very high tides, which sometimes act so violently as to open new channels.

In 1877 the main channel was divided into two passages, in the northern of which there was a depth of 7 feet, and in the southern from 9 to 10 feet. The direction of the southern channel is E.N.E. and W.S.W. and it is situated about 6 miles south of St. Louis. The tidal streams follow the direction of the channel, the flood attaining a velocity of 2 knots and the ebb about 4 knots an hour.*

River.—The River is lowest in June and highest in September, the difference of level (at St. Louis) being 4 feet; from July to November steam vessels can ascend Senegal river to Medina, a distance of 495 miles, and at all seasons vessels drawing 10 feet can proceed to Mafou, a distance of 178 miles from the bar.

The navigation of the river as far as Podor (141 miles above St. Louis) is always easy, and beyond that station, although more difficult, it presents no serious obstacles except at Kippes passage, 2 miles below Medina, where the current at times forms a rapid.

Directions.—The dangers of Senegal bar are well known to navigators; in the rainy season, and even up to March, the great volume of water which is poured out of the river, frequently renders the bar impracticable even to decked boats. The waves of surf produced by the impetuosity of the stream meeting the ocean swell are so prodigious, and succeed each other so rapidly, that it is impossible to find a quiet interval; and it is not uncommon on these occasions for the sea to break in 7 fathoms at a mile outside the bar. From April to the end of September the bar is almost always passable by decked boats, and sometimes by open boats, but it is advisable that they should be managed by natives. Vessels as a rule drawing more than 10 feet cannot cross the bar, and none should be employed in trading with this place which are too large to enter the port, as the employment of lighters is expensive and tedious, a steam vessel to trade with advantage should not draw more than 8½ feet. Once fairly in the river, from 7 to 5 fathoms will be found, and with the assistance of the tide, a pilot will speedily beat a sailing vessel up to St. Louis.

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* Annales Hydrographiques, 1877.

The services of a steam tug can now be secured in crossing the bar: the signals shown from the pilots station are as follows :—

Yellow flag - - - - Bar is practicable.
Blue flag - - - - - Bar is impracticable.
Yellow and blue flag - - Pilots are on the bar and vessel can approach.

Tides.—It is high water, full and change, at Guet-n'-dar and Senegal bar at 8 h. 42 m., and at St. Louis at 10 h. Springs at each place rise 6½ feet.

From February until May the tidal stream is felt as far as Djouldé-diabé, 228 miles from St. Louis, the ebb stream being more rapid and continuing longer than the flood.

During the period of floods, the downward current attains a velocity of about 2 knots an hour at Podor, and 4 knots an hour at Medina.

Currents.—The general and almost constant direction of the current is along the coast from north to south, as far as the mouth of the Senegal. Abreast of this river and for a space of several miles to seaward the powerful tides, both in and out, affect the general uniformity of the southerly current, and are often so strong as to bring vessels, anchored in the outer road, with their broadsides to the wind in the strongest breezes. These outer tides have no very regular set; the flood stream, however, generally runs E.N.E., and the ebb W.S.W.

Winds.—The winds veer between East and North during the greater part of the year, and in the rainy season (July, August, and parts of June and September), as the storms generally come from the S.E., those vessels at anchor in the road, which cannot depend on their ground tackle, will find it easy to get under way. The S.W. winds which succeed being generally feeble, they may return to their berths when the gale is over.

Occasionally during the fine season strong N.W. winds are experienced, but they are of short duration.

Easterly winds are most prevalent during January and February being succeeded by northerly winds in March.

Sea breezes are regularly experienced during the dry season.*

Supplies.—At St. Louis, water, wood, beef, mutton, and poultry may be procured of fair quality, and at reasonable prices.

Telegraph.—St. Louis is in telegraphic communication with the various French settlements in the vicinity.

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* Notice Hydrographique, Paris, No. 27 of 1879.

Population.—In 1877 the total population of the French settlements in Senegal, including natives, was estimated at 607,398.

Coast.—The western point of cape Verde bears from the bar of the Senegal river S.W. by W. ¼ W. distant 87 miles, and the intervening curve is about 11 miles in depth.

For about 10 miles southward of Senegal river the coast is as low as that to the northward; and though it then becomes rather higher, it preserves throughout the same uniform appearance of a chain of white sandhills, with scattered brushwood and here and there a few dwarf trees, until the monotony of appearance is broken by the four red sandhills locally known as Tound or Méléye. The anchorage off these sandhills is named Kelere roads.

Little paps.—To the southward of these sandhills the coast does not present anything remarkable as far as the Little paps, the northernmost of which is in latitude 14° 56′ N.; they are the two highest sandhills to be seen between Senegal river and the Paps of cape Verde. They rise from the beach, and are easily known by a slight undulation on their summit, and by three or four small hills to the southward; they are of dark colour, and visible at the distance of 12 or 15 miles.

There are several villages along the coast between Senegal river and cape Verde, the principal of which are Kelere, Benou Mboro, and Cayar; at Benou Mboro the vegetation, being unusally thick, is conspicuous. Landing can generally be easily effected at Cayar.

Soundings.—From Senegal river as far as the parallel of 15° 20′ N., at 2 or 3 miles from the coast, the bottom is of mud, in 11 to 27 fathoms; and from thence to the southward the depth rapidly increases, as at 6 miles west of the Little paps there are from 57 to 62 fathoms. The same bottom continues, and is so soft that the lead sinks in it, offering good anchorage to any vessel obliged to come to in consequence of calms.

Yof bay, extending from the anchorage off Cayar to Almadie point, should not be too closely approached, as the currents in it are strong and irregular, especially during the winter season.

Cape Verde paps.—Little paps bear about E. by N. from the Paps of cape Verde distant 27 miles. In fine clear weather both may be seen at the same time, as the cape Verde paps are visible 20 or 25 miles. At that distance east of the cape the coast begins to rise and to show more wood, the country about cape Verde being covered with trees, amongst which there are several of considerable height. The bank of soundings here is steep, and all this coast may be approached to a very short distance.

CAPE VERDE,* the westernmost point of Africa, is the extremity of a peninsula forming the west side of Gorée bay, and is moderately high land, rising gradually to the two Paps, the south-western face of which is nearly perpendicular, and is usually mistaken for cape Verde when seen from a distance. The cape itself terminates in low land, on which are some detached hillocks, and which might be taken for islets when seen from a distance.

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* *See* Admiralty chart;—Africa, West coast, Sheet vi., Cape Verde to cape Roxo, No. 599.

LIGHT.—A lighthouse stands on the western mound of cape Verde; it is a white conical building 65 feet high, and exhibits from an elevation of 370 feet above the sea a white light, which *revolves* every *half minute,* and should be seen in clear weather from a distance of 27 miles.

Almadie ledge.—From the extreme west point of cape Verde, a reef of black rocks named Almadie ledge, extends a mile, and is mostly awash, but in two or three places some of the rocks rise 8 or 10 feet above the sea. The westernmost of them has the form of a cube, and stands in lat. 18° 44′ 30″ N. At 3 miles north of this rock there are 71 fathoms, mud and sand; at a mile west of it there are 31 fathoms, shells; and though there is less water S.S.E. of it, vessels may everywhere approach the ledge within a mile, making allowance for a probable inset of the current. It is said that there are one or two openings through the ledge.

Currents.—The prevailing currents between the river Senegal and cape Verde follow the direction of the coast to the southward in the same manner as those already mentioned, but near the shore at cape Verde the tidal streams are very appreciable, the flood dividing into two branches, one setting to the northward, the other setting towards Almadie point; the flood stream occasions strong and irregular currents in Yof bay.* The ebb stream sets off shore.

LIGHT.—The lighthouse on Almadie point, the nort-west extremity of cape Verde, is a square tower 39 feet high, rising from the centre of the keeper's dwelling, and painted white. It exhibits a *fixed red* light, elevated 85 feet above the sea, and should be seen in clear weather from a distance of 8 miles. The lighthouse is built on the western side of the point; from it cape Verde lighthouse bears S.E. ¼ E. distant 2 miles, and the extremity of Amaldie ledge to the westward is distant one mile.

Cape Manuel (Baniul).—From Almadie ledge, cape Manuel bears about S.S.E. ¾ E. distant 8 miles. The intervening shore is high, covered with trees, and generally terminates at the sea-side in basaltic cliffs or rocks. In a few places the cliffs descend into small bays, with beaches of white sand. The cape is high, covered with thick brushwood, and steep-to on its south side, but at the distance of a cable north-westward of its south extreme, and close to the beach, there is a small rock above water.

LIGHT.—The white square tower on cape Manuel, the south-east extreme of cape Verde, is 39 feet high, and exhibits from an elevation of 170 feet above the sea a *fixed red* light, and in clear weather should be seen from a distance of 8 miles. The lighthouse is built on the cliff; from it cape Verde light bears N.N.W. ½ W. distant 6 miles.

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* **Annales Hydrographiques, 1876.**

Madeleine islands.[*]—Two miles W.N.W. from cape Manuel, and a little more than half that distance from the coast, there is a group of four rocky islands named the Madeleines. The largest is shaped like a crescent, open to the westward, and is about 600 yards in length. It consists of a hard red rock with some basalt, and is destitute of any vegetation, though it appears that formerly a few baobab trees grew in its crevices. On the north side there is a very small creek which affords a landing-place. The sea breaks with great violence over the three smaller islands, and through the channel between them and the largest, in which there are 3 fathoms.

In approaching these islands from cape Verde the soundings vary from 30 to 17 fathoms.

Madeleine channel.—There is a depth of 4 to 4½ fathoms in mid-channel between Madeleine islands and the main; steam vessels of 12 feet draught will save fuel by using it, but no attempt should be made to beat through.

GORÉE BAY.—The extensive bay of Gorée, with the island of that name, immediately opens on rounding cape Manuel; and as the water is everywhere deep, vessels bound to the island, which bears E. ¾ N. distant 2¼ miles from the cape, may steer for it direct, if the wind permit.

The channel between Gorée island and Dakar point is seldom used by sailing vessels when entering the bay, as a strong current setting to the southward prevails in it.

Gorée island is half a mile in length and 450 yards in breadth, lying about north and south. It is of volcanic formation, similar to that of the Madeleine islands, and cape Manuel. The southern portion, which is 144 feet above the level of the sea, is the highest, and the rest of the island lowers to the north point. The landing-place is on the north-east side.

A shoal bank, on the outer edge at which there is a depth of 1½ and 2 fathoms, extends along the western side of Gorée island for a distance of 1½ cables from the shore.

Caution.—Boats landing at Gorée island should always have an anchor and cable ready to veer in with.

Population.—The population of Gorée island is about 2,800.

Supplies.—Water is scanty, and the quality bad, the chief supply for the inhabitants is brought from the village of Hann on the mainland, as well as their fuel. Several large stores have been built on Gorée island, from which supplies of European produce can be obtained.* The bay abounds with fish, and the seine may be used in Hann road.

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[*] *See* plan :—Gorée road, on Admiralty chart, No. 1001; scale, $m = 1·0$ inches.

Gorée road.—The roadstead is situated north-eastward of Gorée island; it is sheltered from all winds from S.W. through north to east, and is perfectly safe during eight months of the year, that is from November to June inclusive; but during the rainy season squalls from the south-eastward are dangerous. The best anchorage for large vessels in either season is at the distance of three quarters of a mile north-east of the landing-place on Gorée island, with cape Manuel open westward of the island, where they will find 9 or 10 fathoms on stiff clay, and from whence they can conveniently get under weigh with the wind from any quarter. To reach this anchorage in the fine season, when the prevailing winds are from north-east to north-west, it is necessary to haul close round cape Manuel and the south extreme of Gorée island, and keeping by the wind on the port tack, with the lead going, to stand on till within a mile of the shore on the eastern side of the bay, and tacking there in 9 or at least in 7 fathoms. If not able then to fetch the road, make short boards along that shore, as the southerly current is less strong there, and sometimes even a northerly eddy will be found.

Venus bank.—A bank about 3 cables long and 1½ cables broad, with 4¼ fathoms water on it, lies E. by S. from the south extreme of Gorée island distant 4½ miles, and about 2 miles from the shore on the eastern side of Gorée road.†

Tides.—It is high water, full and change, at Gorée island at 8 h. 8 m.; springs rise 5 feet.

Tornadoes.—In the tornado season, from the berth recommended, if the quality of the ground tackle be suspected, a vessel may easily run out of the road; for which purpose it will be prudent to veer away nearly to the end of the cable so as to be able to slip when everything is ready, and before the weight of the squall comes, accompanied, as it generally is, with a deluge of thick rain, neither of which would be favourable to the expertness requisite on such an occasion. Having slipped, give the north extreme of the island a convenient berth, and when to the westward of this point, whatever may be the violence of the squall (which is generally from S.E. by E. or E.S.E.), the island will afford sufficient shelter to enable the vessel to keep the wind nearly abeam till abreast the south extreme. Having reached thus far, bear up nearly four points to W. ¾ S., and pass cape Manuel. From thence the sea is open, and there is nothing to avoid but the Madeleine islands, and Almadie ledge off cape Verde.

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* Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1873.

† Annonce Hydrographique, No. 53 of 1876.

Mooring.—A vessel intending to remain for any considerable time at the anchorage, should moor E.N.E. and W.S.W., that the eastern cable may be veered so as to bring an equal strain on both in the heaviest squalls.

DAKAR.—Dakar point lies about 1½ miles northward of cape Manuel, and about 1¼ miles westward of Gorée island; the long low point of Belair, on which there is a baobab tree, lies N.N.E. ½ E. from Dakar point distant 2 miles and the town of Dakar stands in the southern part of the intermediate bay; it is the central point of French commerce with the African coast. At Dakar point, two jetties have been built, forming a double basin, affording shelter to the largest class of vessels, and ample facilities for coaling.

The steam packets of the Messageries Maritime company call at Dakar twice a month.

Light.—From an iron pillar at the extremity of the east pier of Dakar harbour is exhibited a *fixed green* light elevated 15 feet above high water, and visible in clear weather from a distance of 3½ miles.

Moorings.—The extremity of the eastern mole can be rounded close to and under its shelter several sets of moorings have been laid down; for vessels of large draught moorings have been laid down farther out, but the holding ground at the latter is not very good.

Supplies.—Water is plentiful and good; at the north extreme of Dakar harbour is a large reservoir with pipes leading over a small jetty into the sea so that a boat can be rapidly filled.

Provisions are good, especially vegetables, and fish is abundant.†

Coal is supplied in lighters containing from 35 to 45 tons* each; small vessels go alongside the jetty.

Population.—The population of Dakar is about 3,000.

Hann bay.—The coast of Hann bay recedes from Belair point, and the watering-place is about a mile N.N.W. from it.

Anchorage.—The anchorage in Hann bay is about a mile from the watering-place, in 21 feet, or nearer in, according to the vessel's draught.

Belair shoal.—At nearly a mile eastward of Belair point, and N. by E. ½ E. distant 2 miles from the north extreme of Gorée island, there is a shoal of about 4 cables in length, within a depth of 3 fathoms, lying nearly east and west, and carrying only 7 feet water on it.

Directions.—Vessels proceeding from Gorée road, to the watering-place in Hann road, must avoid Belair shoal by passing eastward of it in 5 fathoms, at 1½ miles from Belair point, or between it and that point, at half a mile from the latter, in 3¾ fathoms, taking care to avoid the shoal water which extends S.E. by S. 4 cables from the point.

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* Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1873.

Clearing mark.—Bernard point (a low rugged projection the next north of cape Manuel) well open east of Dakar point, bearing S.W. by W. leads 4 cables south-eastward of Belair shoal; and the eastern hummock of cape Verde bearing N.W. by W. ½ W. leads 4 cables north of it.

Fortifications.—The old citadel on Gorée island has been much strengthened; a circular tower on the north extreme of the island mounting 12 heavy guns has been finished and armed; on the west side a small battery to mount 2 or 3 guns is nearly finished.

On Dakar and Belair points, earth works capable of mounting 10 guns are being constructed.*

Current.—Off cape Manuel the current separates into two branches; one sets towards Red cape, the other takes an easterly direction, passes south of Goree island, sets over towards the eastern side of the bay, turns northward and westward, and following the trend of the shore flows back into itself through the channel between Gorée island and Dakar point.

Rufisque village, built east of a point lying E. by S. ½ S., distant 8 miles from Belair point, is rendered conspicuous by a square white tower, visible from a distance of 8 or 9 miles.

A reef of rocks forms a small bay to the eastward of the point, which is much frequented by coasting vessels.

Several factories have been built on the east side of the tower from one of which a pier extends.

A reef above water lies W. ¾ N. from Rufisque point distant 6 cables; it is 2 cables from the shore.

LIGHT.—A fixed *red* light, elevated 52 feet above the sea, visible in clear weather from a distance of 3 miles, is exhibited from the tower situated W. by S. of Rufisque.

Coast.—From Gorée road the coast rises a little, at some miles inland from the low white sandy strand. In advancing to the south-eastward the sandhills progressively rise, and are covered with trees as far as cape Naze, which lies S.E. ⅓ E., distant 20 miles from cape Manuel.

Red cape, lying S.E. by E. ½ E. from Gorée island distant 14 miles, is the northern of three projections which are the prominent features of this part of the coast; it is tolerably high and of a reddish colour.

The middle projection is known as Toubab Guialao, and is somewhat similar in appearance to Red cape, but not so high; it lies about 2 miles south of that cape. A group of rocks extends about 100 yards from the shore at its base.

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* Commander S. Douglas, H.M.S. *Espoir*, 1864.

Between Rufisque and Red cape are situated the villages of Bargney and Hyenne or Yen, the position of the former being marked by some dark rocks on the beach, and the latter being built on a slight eminence and fronted by a bank on which there is about 4 fathoms water.

Cape Naze, a remarkable looking cliff of yellow and reddish colour, is the southern of these three projections, it terminates in cliffs of about 1,200 feet in height, the woody summit of which may be seen at a distance of 20 to 25 miles in fine weather; in the space between it and Hann road several negro villages will be seen, which are frequented by the coasting vessels of Gorée, who trade with them for stock; at 2 miles from this shore, a depth of from 7 to 13 fathoms may be obtained.

Cape Naze is bold-to and when approaching from the northward the land south of it appears as a low point covered with trees.

Gombaroo point lies S. ½ E. distant 3 miles from cape Naze, it is a low point terminating in a sand bank; a village stands on the coast near the point. From about 2 miles south of Gombaroo point the extensive series of banks commence which front the shore as far as the entrance to the river Gambia.

Portudal lies S.S.E. ¾ E. distant 3 miles from Gombaroo point. This village has a bank lying off it about a mile wide, which in some parts nearly dries at low water, but there are 3 fathoms between it and the shore reef, 4 fathoms close to its west side, and 9 fathoms 4½ miles west of it.

A square white tower, built for the accommodation of the French garrison, is a conspicuous object at Portudal.

Anchorage.—Small vessels anchor off Portudal in 4½ fathoms, with the largest cluster of houses bearing E.N.E., those of larger draught anchor in 6 fathoms, with the same houses bearing E. by N.

Serine point.—From Gombaroo point to Serine point, which is low and marked by a village upon it with a conspicuous house, the bearing and distance are S. by E. ¾ E. 15 miles, the coast receding a little, with some villages built upon it, and in front of them are rocky shoals, while shallow irregular soundings are found at a distance of 3 or 4 miles from the shore.

Amboroo bank. — The flat and foul ground between Portudal and Serine point is connected with Amboroo bank, which projects W. ¼ N. nearly 7 miles from Serine point. The western portion of the bank is a crooked reef, lying about north-east and south-west, 4½ miles in length. Its western extreme is awash, and on other portions the sea always breaks in bad weather, or shows a strongly discoloured line of water. There are 4 fathoms close to its outer edge, but no vessel should approach it nearer than 6 fathoms. Its inner edge is from 3 to 4 miles from the shore, leaving a navigable channel between for vessels of small draught at all times, and even for large vessels in a case of great emergency. This inner channel is generally adopted by coasting vessels when beating to the northward, as they find there smoother water and less current, and are well acquainted with those tints upon the sea which indicate open or shoal water. No landmarks are to be recognised on this coast; but there is no danger in standing in towards any part of the shore, provided the lead be kept going, and the vessel kept in 7 fathoms, which is at least a mile outside of any danger.

Tides.—It is high water, full and change, on Amboroo bank about 8 h. 15 m.; springs rise 6 feet.

Joal or Guque point.—At a distance of 7 miles S. by E. from Serine point lies Joal point, the coast between forming a shoal bay, from the shores of which shallow banks extend nearly 3 miles; outside of them, however, and southward of Amboroo bank, the water shoals regularly up to the line of 5 fathoms.

The French mission establishment of St. Joseph is situated about one mile north of Joal point, the buildings at the village are conspicuous for a long distance.

Joal village is situated on the banks of a river of the same name, it is rendered conspicuous from seaward by a chapel and square tower near the beach, which are visible for a distance of 7 or 8 miles.

Fajodj or Fadjoudj river.—At 4 miles S. by E. ½ E. from Joal point there is an inconsiderable stream, named the river Fajodj, the bar of which, at low water, is almost dry, and at high water is only passable by canoes and vessels under 6 feet draught.

Palmerin point.—At nearly 5 miles south of Fajodj river there is a slight projection of the land, with a clump of trees upon it, named Palmerin point, with a reef extending from it 2 miles to the westward.

Joal patches.—Between Joal point and Palmerin point there are several shoal places on the bank which extends from the shore, of which some dry at low water, these shoals are known as Joal patches.

Joal flat.—Between Fajodj river and Palmerin point a bank with less than 6 feet on it, known as Joal flat, extends a considerable distance from the shore.

All this portion of the coast should be navigated with great attention paid to the soundings, and by keeping in 7 fathoms a vessel will not be nearer than two miles to any danger.

Punshavel point.—A straight uninteresting coast, with a broad sandy beach, and the country inland covered with trees or brushwood extends for 15 miles in a S. by W. direction, from Palmerin point to Punshavel point, a long narrow spit, the northern limit of the great estuary which leads into the river Gambia.

Soundings.—The coast between cape Verde and Gambia river should not be approached in hazy weather under 7 fathoms by vessels of large size. On the meridian of cape Verde and at 27 miles west of Gombaroo point the depth is 63 fathoms, and the bank steep-to.

At 18 miles west of Portudal the depth is 19 fathoms, shoaling gradually to 8 fathoms at 5 miles from that place. Off Serine point the water gradually deepens from Amboroo bank, and at 21 miles in a westerly direction from that point the depth is 20 fathoms, whence to the parallel of Punshavel point, the 20-fathom line follows the curve of the shore at a distance of about 18 miles.

Winds and weather.—The prevailing winds on that portion of the coast described in this chapter are during the fine season from E.N.E. to N.N.W., veering gradually during the day from the former to the latter direction ; this daily variation is not experienced when farther from the coast than about 30 miles ; the land breeze at night is felt when near the shore.

During the rainy season (end of June to middle of September) S.W. and West winds occasionally blow with violence, but are not of long continuance ; these westerly winds are generally light, and frequently interrupted by calms, particularly on the parallel of St. Louis.

Fogs are common on the coast at all seasons of the year.

Rollers occasionally set in with great violence and the sea has been known to break in a depth of 9 fathoms.

CHAPTER VI.

CAPE VERDE ISLANDS.

VARIATION in 1880.

St. Vincent island - - 19° 50′ W.

CAPE VERDE ISLANDS* are a group of fourteen islands, belonging to the kingdom of Portugal, that were discovered in the middle of the 15th century; they are situated about 320 miles west of cape Verde, lying between the parallels of 17° 12′ and 14° 46′ north latitude, and the meridians of 22° 40′ and 25° 22′ west longitude.

The islands are of volcanic origin, generally mountainous, rocky, and badly supplied with water. The channels between them are generally navigable; and the passage eastward of the group is clear of danger, the depth midway to cape Verde being 1,950 fathoms, mud and shells. In this passage, and to the north-east of the group the sea is frequently much discoloured, caused probably by the meeting of currents.

Population.—The islands are not all inhabited; the population are a mixed race of Portuguese and negroes, numbering (in 1872), 76,003.

Government.—The islands are governed by a governor-general appointed by the Portuguese government; St. Jago, the principal and south-eastern island of the group, contains the town of Ribeira Grande, formerly the capital, but the governor-general now usually resides at Porto Praya in the same island.

Produce.—Those portions of the islands that are not composed of rock and lava are sandy and barren, but fruits, both European and tropical, are grown in abundance. The tamarind and palm are the principal trees. Goats and poultry are numerous, also wild birds and turtle. The scarcest commodity is fresh water.

The chief articles of commerce are salt and orchilla, the former is made at all the islands, but especially at Sal: the annual export of salt is about 15,000 tons.

Climate.—The months of August, September, and October form the wet and sickly season, when strong gales from the southward, tornadoes, and calms are experienced. The remainder of the year is known as the dry season; during the months of December, January, February, and March these islands are frequently enveloped in a dense haze, which is not at all times attended with moisture, but by fine dust or sand that is probably blown across from the Sahara desert. The healthiest months are from November to July.

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* *See* Admiralty chart:—Cape Verde islands, No. 366.

Occasionally the annual rains fail among the Cape Verde islands, causing destructive famines.

Winds.—From January to March the trade wind blows from N.E. to North and N.N.W., the harmattan is also felt. From April to June the direction of the trade wind is between N.E. and East, of less force as it veers eastward. From July to September the trade is varied by winds from S.E. to S.W., squally, with fogs, tornadoes, calms, and rain. In October winds blow from S.E. to S.W., with squalls and fogs. 'During November and December the trade-wind blows from N.E. to North, the harmattan is also experienced during these months. Calms extend for a considerable distance to leeward of each island.

Near the shores of the islands the alternation of land and sea breezes is experienced.

Currents.*—The Cape Verde islands lie in the track of the North African current which sets down upon them in a south-westerly direction at a mean rate of about half a knot per hour, being influenced more or less by the prevailing wind; the eastern islands of the group, viz., Sal, Bonavista, and Mayo, more especially feel the force of this set, the amount of which is occasionally very uncertain.

Great caution is therefore necessary when navigating in the vicinity of these islands.

Rollers.—During July, August, and September, rollers are of common occurrence, being generally heaviest at full and change of the moon.

ST. ANTONIO ISLAND.†—This island is the north-western of the Cape Verde islands; it is high, and may be seen from a great distance in clear weather, but the summit is generally clouded.

The island is 22 miles long in an E.N.E. and W.S.W. direction, with a general breadth of 11 miles; the highest mountain, situated at the north-west part, is 7,400 feet above the sea.

Punta do Sol, or North point, extends as a low sandy point some distance from the cliffs at the north extreme of the island, it has a reef projecting some distance from it, but at 1¼ miles north of the point the depth is more than 100 fathoms.

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* In the channel between St. Antonio and St. Vincent islands the current was observed to be tidal. During neap tides the surface water ran north, three hours after the tide commenced to rise, and ran for five hours at the rate of one knot an hour; it is, however, affected considerably by the trade wind. H.M.S. *Challenger*, 1873.

† *See* Admiralty plan:—St. Antonio island, No. 367; scale, $m = 0{\cdot}5$ inches.

Santa Cruz.—The chief town of the island is situated on North point; the custom house and church are conspicuous objects. A small supply of water can be procured here.

Vessels occasionally anchor off the town in from 14 to 18 fathoms, good holding ground.

Coast.—The north coast is nearly straight for 17 miles in a W. by S. direction, from Punta do Sol to the west extreme of the island; whence to South point, the intermediate coast recedes about 2 miles; at 2 miles north of South point is situated a bight named Tarrafal bay.

East point is situated 9 miles S.S.E. from Punta do Sol; midway a point projects about a mile beyond that line, this projecting point has some rocks lying off it, and a village situated south-eastward of it.

Bull rock.—At 2 cables east of the northern extremity of East point, there is a small rocky islet, with some rocks extending from it.

Coast.—The south side of the island is nearly straight for 17 miles in a W.S.W. direction from East point, when it turns and trends W. by N. for a distance of 6 miles to South point. West of East point, distant 8¼ miles, a small stream known as Rio Janella empties itself into the sea, to the eastward of which there is a bight named Carboeiros bay, where indifferent anchorage can be obtained, off a few houses standing on a sand and gravel beach. At 12 miles westward of East point is situated the village of Santa Cruz, and off the point which lies 1¾ miles westward of that village, a reef and foul ground extends about a mile, narrowing the channel between St. Antonio and St. Vincent islands to a breadth of 6 miles.

Directions.—When approaching from the northward, the land should not be neared within 5 miles on the east side of the island, as calms prevail that distance from the shore. The channel between St. Antonio and St. Vincent islands is safe, and the eye must serve as a guide to keep clear of the light winds that may be occasioned by either island.

Tarrafal bay.*—There are several anchorages round St. Antonio island available for small craft, but none equal to Tarrafal bay that is situated on the west side, 2 miles northward of South point, where a vessel may lie in safety, and where the best water may be procured that is afforded by the Cape Verde islands.†

A shoal of 6 feet lies one cable north of the south entrance point of Tarrafal bay, and a bank of 3½ fathoms lies N.E. by N., distant 1½ cables from the same point.

Directions.—Tarrafal bay may be known by a green plantation, and a black sandy beach under a cliff, that come in view after rounding

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* *See* Admiralty plan:—Tarrafal bay, No. 368; scale, $m = 4{\cdot}1$ inches.

† In February, 1877, H.M. brig *Martin* watered here, but found the supply brackish; masters of whaling vessels usually prefer watering either at Porto Praya or on the African coast.

South point. In rounding South point allowance should be made for a current which sometimes sets towards it. A good berth may be had in 39 fathoms, 3 cables off shore, with a red mark in the cliff bearing E. by S. Caution will be requisite in anchoring, as the shore is steep-to.

There is a conspicuous white mark low down on the cliffs, situated 2 miles north of Tarrafal bay.

Supplies.—The water which drains from the hills is collected in small reservoirs, the nearest to the beach being about 50 yards from the high water line.

No other supplies can be obtained here.*

Tides.—It is high water, full and change, in Tarrafal bay at 7 h; springs rise about 5 feet.

Winds.—Tarrafal bay is open from S.W. by S. to N. by W., but the winter winds seldom blow home; in December and January, however, there is generally a swell that occasions some surf on the beach.

ST. VINCENT.†—The island of St. Vincent is the most useful of the Cape Verde islands, possessing the spacious harbour of Porto Grande, which is the port of call for various mail steam packets, as well as for vessels of war requiring coal.

The island is situated 6 miles south-eastward of St. Antonio island, with a clear channel between them. It is 30 miles in circuit, composed of mountains of volcanic origin, that are divided into two ranges by a valley extending from the south-west part of Porto Grande, to within two miles of the east extreme of the island. The north-east portion of the island is the highest, where Green mountain rises 2,483 feet above the sea.

Porto Grande.‡—This bay is situated on the north-west side of St. Vincent; it is 2 miles wide at the entrance, the outer points bearing E. by N. and W. by S. from each other, and it is 1½ miles deep. Between the points of entrance the bottom is even, with 22 fathoms in the centre, shoaling gradually on the west side to 9 fathoms, which is found three-quarters of a cable from the shore; to the eastward there are 17 fathoms within a short distance of the coast. In the centre of the bay the depth is 10 fathoms, shoaling gradually in all directions towards the shore.

Orontes bank, on which there is a general depth of 2 and 2½ fathoms, sand and coral, extends about 3½ cables from the south-east side of the bay.

Anchorage.—There is ample sheltered anchorage ground in Porto Grande. With N.E. winds violent squalls are of frequent occurrence, and vessels should always be prepared with a second anchor in case of parting or drifting. Vessels of large draught are recommended to anchor well clear of Orontes bank. A good berth is in 10 fathoms, gravel, with Bird island bearing North, and the fort situated half a mile north of the town bearing E.S.E.*

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* Lieutenant C. Johnstone, H.M. brig *Liberty*, 1877.

† *See* Admiralty plan:—St. Vincent island, No. 369; scale, *m* = 0·8 inches.

‡ *See* Admiralty plan:—Porto Grande, No. 370; scale, *m* = 4 inches.

Directions.—In coming to in Porto Grande, under sail, shorten sail in time, and look out for heavy gusts over the high land. If in want of coal, a berth should be taken in the south-east part of the bay, where the water is smoother and the squalls less felt.

Coal hulk.†—A coal vessel, belonging to a private company, is moored close to the northern edge of Orontes bank; from it Bird island summit bears N. ¾ W., and the fort bears E.N.E.

This vessel is without masts, and exhibits by day a red, white, and blue flag, and by night a white light; vessels should not anchor to the southward of the position of this hulk.

Telegraph cables.—Two submarine cables communicating with Madeira and Rio de Janeiro are landed in the northern bight on the east side of Porto Grande. A black conical buoy with staff lies in 7 fathoms N.W. ½ N. from the fort, distant 3⅓ cables; it lies one cable south-west of the telegraph cables.

Bird or Jow island is 300 yards long, north and south, and 150 yards broad; it lies 7 cables N.W. by W. from the east entrance point of Porto Grande. The island is rocky, bold to, 270 feet high, and appears conical.

Directions at night.—When entering Porto Grande at night the high land all round is very deceptive, and Bird island is the only guide: it always shows clearly and distinctly, even on the darkest nights. After passing Bird island, bring it (in a large vessel) to bear North, and anchor on that bearing in 10 fathoms, sand, the west entrance point of the bay bearing W. by N.

Supplies.—Coal is supplied in bags in large quantities from iron barges holding about 20 tons each, towed by steam launches, and vessels can obtain it at the rate of 18 tons per hour. Other supplies may be procured to a moderate extent. The price of fresh beef is 7*d.* per pound, and that of vegetables 3*d.* per pound. Water is supplied from a floating tank, but steam vessels would probably find it cheaper to distil their own. Porto Grande is the residence of Her Majesty's consul.

There is no quarantine establishment at Porto Grande.

Tides.—It is high water, full and change, in Porto Grande at 6 h.; springs rise 3¼ feet.

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* In September, 1876, the wreck of a lighter lay in 6½ fathoms about 4½ cables west of the fort on the east side of the harbour; its position was marked by a black buoy with a red flag. Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer.*

† Shipping Gazette, December 3rd, 1875.

Current.—Between St. Antonio and St. Vincent islands a current frequently sets to the north-eastward; this current is also experienced between Bird island and the shore of St. Vincent.

Coast.—The north side of St. Vincent is cliffy, between Ponta Columna and Ponta do Ribeira Julian, the eastern entrance point of Porto Grande, it is high and rugged, the former point is surmounted by a rock, which, seen from a distance resembles a column. The north-east side of the island is indented by two open bays, known as Salamasa bay and Praya da Gatta bay, the coast is low, and should not be approached.

The south-east extreme of the island has some detached rocks extending from it, whence to the south and west points the shores are apparently bold.

From a distance of 12 miles to the north-eastward, the south-east extreme of St. Vincent, surmounted by a high hill, appears as an island.

San Pedro bay.—There is anchorage during the dry season, in 10 fathoms in San Pedro bay, south of the west extreme of St. Vincent, and wood and water can be obtained from the bays in that vicinity.

Foul channel.—The north-west extreme of Sta. Lucia island is distant from the south-east extreme of St. Vincent 4 miles in a S.E. by E. direction; the passage between them is named Foul channel. In this channel, when blowing fresh and with the tide setting to windward, there is an appearance of shoal water, but H.M.S. *Leven* beat through, and did not find less than 6 fathoms, with 15 fathoms in mid-channel.

STA. LUCIA ISLAND.*—The north extreme of Sta. Lucia island is situated E. by S. ¾ S. distant 5 miles from the south-east extreme of St. Vincent. The island is 6 miles long in a north-west and south-east direction and 1½ miles in width, the summit, 1,209 feet high, being near the middle, with a range of hills extending from it to North and South points.

Almost all the coast is rocky and unapproachable, affording no secure anchorage, but good landing may be obtained at 1½ miles east of South point.

East point is high and surmounted by several peaks, being separated by low land from South point, which is 910 feet high.

Leon islet, lying N.N.W. distant $1\frac{1}{10}$ miles from South point, is moderately high.

In the bay between Leon islet and South point are the ruins of a village, and a well of good water.

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* *See* Admiralty plan:—Sta. Lucia, Branca, and Raza islands, No. 377; scale, $m = 0{\cdot}8$ inches.

Temporary anchorage may be obtained during the fine season in this bay, in from 8 to 15 fathoms, sand and pebbles.

BRANCA ISLAND lies S.S.E. distant 5 miles from the south extreme of Sta. Lucia island. The highland is high and inaccessible except in very fine weather; the south extreme is low and sandy, and has a reef extending a short distance from it. Branca island is 2 miles long in a N.N.W. and S.S.E. direction and half a mile broad, the summit over the northern part of the island is 978 feet high.

Soundings.—Between Sta. Lucia and Branca islands there are soundings in from 8 to 13 fathoms; H.M.S. *Leven* anchored during the survey in 1820, in 12 fathoms, hard bottom, with the east extreme of Sta. Lucia bearing N.N.E. ½ E., and South point N.W. ¾ N.

Caution.—When navigating between Sta. Lucia and Branca islands the south and east coast of Sta. Lucia should not be approached within a mile, as the ground is uneven; the water when two or three miles north-east of Sta. Lucia becomes discoloured, which may serve as a guide in approaching the island.

Tides.—It is high water, full and change, between Sta. Lucia and Branca islands at 7 h; springs rise about 5 feet. The flood stream sets to the westward and the ebb to the eastward, with a velocity of 2 knots an hour during springs.

Current.—H.M.S. *Swallow* in May 1862 experienced a south-westerly current of 2½ knots per hour, at 10 miles north-eastward of Branca island.

RAZA ISLAND is situated 8 miles W. by N. ½ N. from West point of St. Nicholas island and 2¾ miles south-east of Branca island; it is a small cliffy island with almost inaccessible shores, 5 miles in circuit, composed of hills, the highest of which, near the centre of the island, being 316 feet above the sea.

In the channel between Branca and Raza islands the soundings are irregular, varying from 6 to 18 fathoms.

ST. NICHOLAS ISLAND[*] is the easternmost of the north-west group of the Cape Verde islands. The island is of irregular shape; its greatest length is 25 miles in a W.N.W. and E.S.E. direction; the north-west portion is the highest, where Monte Gordo attains an elevation of 4,415 feet; whence to the east extreme a range of mountains of about 2,000 feet high extends, conspicuous amongst them being the Sugar-loaf mountain near the middle of the island. In clear weather this island has been seen from a distance of 80 miles.

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[*] *See* Admiralty plan;—St. Nicholas island, No. 378; scale, $m = 0·5$ inches.

St. George bay or Porto Velho. — The south side of St. Nicholas island is indented by St. George bay, which forms a bight 5 miles deep, between East and South point; East point bears E. ¼ S. distant 17 miles from South point.

Rolla road.*—At the north-west side of St. George bay and 6 miles north-east of South point is situated the principal commercial port of the island, named Rolla road; it is readily recognised by the conical hill over it, known as Monte Formoso, and the flagstaff on the fort of Preguiza.

Anchorage.—Vessels may anchor in Rolla road, in from 10 to 13 fathoms, sand, with the fort bearing N.W. by W. Vessels merely wishing to obtain supplies are recommended to stand off and on.

Krabbe point, the west limit of Rolla road, has foul ground extending from it, and should not be approached nearer than three quarters of a mile.

East point.—The east extreme of the island, and the eastern limit of St. George bay, is a promontory 13 miles in length with an average breadth of 2½ miles, composed of mountains between 1,500 and 2,000 feet high, and terminating in a plateau, with a rock upon it that resembles a sail; some detached rocks fringe the north shore of this promontory.

From East point the nearest land to the eastward is the island of Sal, the south point of which bears E. by S. ¾ S., distant 59 miles.

South point. — The south extremity of St. Nicholas island is a narrow promontory projecting 5 miles, the moderately high land of which forms the western limit of St. George bay, and the eastern limit of Tarrafal bay.

Freshwater bay.—At 6 miles westward of East point there is an open bay with deep water close to the shore, where, in fine weather and at neap tides, fresh water may be obtained.

Squalls.—The bay of St. George, and the island of St. Nicholas generally, is subject to furious squalls, which come on during any breeze without warning.

Tarrafal bay. — From South point the coast treads in a general N.N.W. direction for 10 miles, to a round sandy point situated 1½ miles south of West point. Midway between South and West points the coast recedes 2 miles, forming Tarrafal bay, where anchorage may be had during the fine season in 20 fathoms, at 3 cables off shore. Heavy squalls blow down the ravines on the north side of this bay.

At the southern part of Tarrafal bay is situated a custom house.

West point.—The west extreme of St. Nicholas island is low and rocky, with soundings for 4 or 5 miles to the southward at a distance of from a half to three quarters of a mile from the shore.

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* *See* Sketch of Rolla road on Admiralty plan, No. 378; scale, *m*=3 inches.

Anchorage.—A vessel might anchor under the lee of West point in the calm, during the fine season, a good berth being in 35 fathoms, at three-quarters of a mile off shore, with West point bearing N.E. ½ N. distant one mile.

North point. — From West point the coast trends about E.N.E. for 7 miles, where the north extreme of the island is formed by a round cliffy point, having a summit 2,311 feet high. On the north-west side of this point a sandbank fringes the coast, and a reef of rocks extends to the northward for a distance of 5 cables.

North east point, low and stony, bears from North point S.E. by E., distant 8 miles, the coast between forming a bight 2½ miles deep, from the head of which Tarrafal bay is distant 5 miles in a W.S.W. direction, and St. George bay about 3 miles in a southerly direction. Eastward of North-east point the coast trends S.E. by E. for 13 miles to East point, and is composed principally of cliffs, having rocks and sand at their bases.

SAL ISLAND* is the north-eastern of the Cape Verde islands; it is 17 miles long north and south; the northern portion is about 5 miles wide, with rocky shores and mountains, the northern of which (Martinez peak), is 1,340 feet high. The island narrows towards the south extremity, where it terminates in a dangerous sandy spit of considerable length, which is steep-to.

The only production of this island is salt, which is brought to the sea shore on railroads.

Population.—The number of inhabitants in Sal is about 750.

Coast.—The east side of this island is steep and rocky. East point, one mile N.N.E. from the south-east extreme of the island (Wreck point) has a conical summit over steep cliffs.

Firestone hill, 1¼ miles north of east point, is a conical hill, rising immediately over the coast.

Haze.—The island may be seen in clear weather from a distance of 30 or 40 miles, but sometimes the haze is so thick, not only about the island of Sal, but the Cape Verde islands generally, that the surf is seen before any land can be recognised.

Directions.—In passing this island from the northward care must be taken to avoid South point, especially at night, as the low sandy spit extending from it is steep-to; the water should not be shoaled to less than 30 fathoms.

Mordeira bay.†—This bay on the west side of Sal island, is situated 6 miles north of South point, and is about 2 miles deep.

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* *See* Admiralty plan :—Sal island, No. 379; scale, $m = 0\cdot5$ inches.

† *See* Admiralty plan :—Mordeira bay, No, 381; scale, $m = 1\cdot0$ inches,

Bird island is a small island off the north entrance point of the bay, connected to it by rocks; from it Turtle point, the low south entrance point of the bay, bears S.S.E. distant 4 miles.

Anchorage.—Mordeira bay affords good anchorage except during the rainy season, when southerly winds blow in, accompanied by rollers, making it unsafe. A good berth is in 12 fathoms, with Bird island just shut in by the north entrance point, and Turtle point bearing south. A good mark for recognising Mordeira bay, is a conspicuous hill 620 feet high, over the north entrance point, somewhat resembling a lion's head.

Care should be taken to ascertain the quality of the bottom before anchoring, as there are many foul spots in this bay.

Water cannot be obtained in Mordeira bay.

Palmira bay, about 3 miles north of Bird island, should not be used as an anchorage except in case of necessity. From Palmira point, its north extreme, a reef extends about 500 feet to the southward, under shelter of which a few trading vessels moor.

South bay, or Port Santa Maria, at the south extreme of the island, is formed by Wreck point, the south-east extreme of Sal, and South or Salina point, which bears from it W. by N. distant 2 miles.

Anchorage may be had in fine weather in 7 fathoms in the centre of South bay, just inside the line of its entrance points; too great caution cannot, however, be exercised when navigating near South point, as a spit extends nearly a mile S.S.E. from the low sandy shore, with 14 fathoms close to its outer edge, and at 1¼ miles from the shore the depth is 25 fathoms. A vessel might also anchor on the west side of South point in 7 fathoms, half a mile off shore, with Wreck point just shut in by South point. The only settlement on the island is at the head of South bay.

Wreck point is low and sandy, fronted by rocks which extend half a mile from the shore.

Soundings.—The east and north sides of Sal are fronted by rocks extending half a mile from the shore; on the west side of the island, between the north-west extreme and South point, soundings in from 20 to 30 fathoms can be obtained one mile off shore.

Current.—Generally there is a set to S.W. about half a knot per hour in the neigbourhood of Sal; and amongst the islands the current is frequently strong, irregular, and influenced by the wind.

Tides.—It is high water, full and change, at Sal island at 7 h. 45 m. springs rise 5 feet.

BONAVISTA or BOAVISTA ISLAND.[*]—This island is nearly circular in shape, 50 miles in circuit, and partakes of the general mountainous character of the group. The shores are low, and consist principally of long sandy beaches separated by rocky points with detached dangers lying off them. This island (1,260 feet high) may be seen from a distance of 35 miles.

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[*] *See* Admiralt plan;—Bonavista island, No. 380; scale, *m* = 0·5 inches.

Bonavista is traversed through the centre from north to south by a high range of mountains, separated from isolated hills on the north-east and south-west portions by deep valleys. The northern summit of this range is a treble peaked mountain, known as Mount Juan Fernandez; near the eastern extremity of the island are some extensive salt pans, the manufacture of salt being the chief industry.

Anchorage may be had in three places off the west side of Bonavista island—in English road, off Coral reef, or in Portuguese road; the former of these places is the best, where a vessel may anchor inside or outside the reef off the small island, in view of the town.

Rollers.—About this island the rollers are very heavy, and render remaining at anchor unsafe; there is not any stated time for their setting in, but they often occur at the full and change of the moon.

Caution.—A south-westerly current generally sets strongly towards Bonavista island. When drawing near a good look-out should be kept; in clear weather the dangers show themselves, but when misty it is not advisable to approach the island, as the currents about it are sometimes irregular.

East sand-head, the east extreme of the island, is very dangerous to approach, being low and fronted by rocks extending a mile from it; while at 2 miles from the shore the depth is 55 fathoms.

South of East sand-head, distant 1½ miles, a reef of rocks extends 6 cables from the shore.

Hartwell point bears N. by W. from East Sand-head distant nearly 6 miles, the bay between is known as Puerto del Norte, it is encumbered by islets and shoals, of which the principal are Dutch island, Braithwait island, North bay, and Hartwell reef.

Hartwell reef.—The north-east extreme of Bonavista island is fronted by islets and rocks extending for a distance of 3½ miles from the shore, the outer shoals being named the Hartwell reef, on which many vessels have been set by a south-westerly current and wrecked. The reef is steep-to, there being more than 100 fathoms at half a mile eastward of it.

Directions.—When in the vicinity of Hartwell reef the north extreme (North point) of Bonavista island should be kept open north of Broyal point, bearing W. by N. ½ N., and the south-east bluff of the island (Brazen hill bluff), open east of the East sand-head, bearing S.W. by W. Too great caution cannot be exercised at night or in thick weather when passing eastward of the Cape Verde islands.

Broyal point, situated N.W. ½ W. distant 4 miles from Hartwell point, is an extensive rocky projection that separates the sandy beaches between North and Hartwell points from each other; foul ground extending three quarters of a mile from Broyal point. The bay between North and Broyal points is 1½ miles deep, and fronted by rocks extending 2 miles from the shore.

North point.—The north extremity of the island is rocky and foul for three quarters of a mile from the shore, and at one mile from the shore the depth is 30 fathoms. North point bears from the south extreme of Sal island S. by W. ¾ W., distant 21½ miles, the channel between them being free from danger, but the current generally sets strongly to the south-west through it and on Bonavista island

North bluff, about 2 miles south-west of North point, is steep and cliffy. Bluff reef, situated half a mile north-west of the point, generally breaks.

ENGLISH ROAD.—At 4 miles S.W. by S. from North point is situated Small island, connected to the shore by a reef half a mile in length, and at 6 miles further in the same direction is situated Coral point, low and rocky; between these points, and receding on a sandy shore for 2 miles, is English road, in which are several reefs.

In the northern part of English road is situated the old town of Rabil, and at 2¼ miles south of it is the new town of the same name, conspicuous by the belfry of its church: between the towns are situated extensive salt pans.

In the northern part of the road there is a wharf adapted to the use of small vessels.

Ten-feet reef, that generally shows, lies 6 cables S.W. by S. from the south extreme of Small island, with 5 fathoms between them.

Inner and New Town reefs are situated at the north-east part of the road, half a mile off shore, and connected to it at low water.

Anchorage.—On a line between Coral point and Ten-feet reef there is a depth of from 8 to 11 fathoms. East of Ten-feet reef, with Small island summit bearing North and mount Juan Fernandez, bearing E. by S., a good berth may be had in 11 fathoms.

To enter.—Coasting vessels usually haul close round small island, passing north of Ten-feet reef, but a stranger should bring New Town church to bear E.S.E. and pass southward of it.

Coral reef.—On the bearing of W. by S. from Coral point distant 1¾ miles, there is a small islet surrounded by rocks and apparently connected to the shore; from the islet West point bears S. by E., distant 2 miles, and at 4 miles N.W. from it there is a depth of 38 fathoms; a vessel might find anchorage off this reef.

West point is the western extremity of Bonavista island; it is low, sandy, and distant from South point 11 miles in a general N.W. direction.

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* *See* Admiralty plan:—English road, No. 381; scale, $m = 0{\cdot}8$ inches.

The intermediate coast is formed by two round sandy points, having foul ground extending some distance from them.

South, or Urrateo point, the southern extremity of the island, is a cliffy termination of low sandy ground, fronted to the south-east, at a distance of three quarters of a mile, by a small low island (South island) half a mile in circuit; the ground off the island as well as off South point is foul for some distance, but at one mile southward of South point there is a depth of 13 fathoms. From the point, a slightly curved beach, 9 miles long in an E.N.E. direction, extends to Brazen Hill bluff, the south-east extreme of Bonavista island, which is surmounted by a conical hill.

Portuguese road, on the west side of South point, affords shelter from N.E. winds in 14 fathoms, at three quarters of a mile off shore.

Leton rock is a dangerous coral shoal between Bonavista and Mayo islands, where, in the early part of the present century, one of a fleet of East India ships was totally, and others nearly, wrecked.*

The rock is the summit of a bank of coral, which within the 100-fathom line is about 14 miles long in a N.N.E. and S.S.W. direction and about 8 miles broad in a W.N.W. and E.S.E. direction; no part of the rock is above water, and it breaks heavily even in moderate weather.† From the middle of the shoal the south extreme of Bonavista island bears E. ½ N. distant 21 miles; north extreme of Bonavista bears N.E. distant 28 miles; and the north extreme of Mayo island S.S.W. ¼ W. distant 29 miles.

Soundings.—North of Leton rock distant 1¾ miles the depth is 34 fathoms, the bottom white coral; W. by N. 3 miles from the rock the depth is 63 fathoms, coarse sand, shells, and coral; S. by W. ½ W. distant 3 miles there are 40 fathoms, fine sand and coral; S.E. ½ E. 2 miles from the rock, 39 fathoms, green sand and broken shells; East distant 1½ miles, 41 fathoms, fine sand; N.E. of the rock, at a distance of 3 miles, there are 46 fathoms, and at 5 miles N.N.E. the depth is 76 fathoms, the bottom a fine light sand, with red specks.

MAYO ISLAND‡ lies E.N.E. distant 13 miles from St. Jago island and S.W. distant 44 miles from Bonavista island; it is 13 miles long north and south, with an average breadth of 6 miles. The island is moderately high (720 feet), and may be seen from a distance of 30 or 35 miles, making in the form of hills.

Population.—The number of inhabitants in Mayo island is 770.

Coast.—The east side of the island is generally rocky; the other sides have low and sandy points.

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* *See* Admiralty chart:—Cape Verde islands, No. 366.

† Mittheilungen Hydrographie, No. 22 of 1874.

‡ *See* Admiralty plan:—Mayo island, No. 382; scale, *m* = 0·5 inches.

North point.—This point is low and narrow, jutting out nearly 2 miles, with detached rocks on its east and west sides extending one mile from it; to the north-eastward it should not be approached nearer than 4 miles, or without great caution.

Galhao, or North reef.—A dangerous group of rocks, one mile long in a north-east and south-west direction, lies one mile off the north extreme of Mayo island, with foul ground between it and the shore. The outer part of the reef bears from North point E. by N. ½ N., distant 2 miles.

N.N.E. of Galhao reef, distant 6 miles, there is a bank on which the least water obtained was 45 fathoms, sand, with more than 130 fathoms between it and Leton rock.

Foul point lies 2 miles S.W. from North point; the bight between is full of rocks.

Rocky point is the north-west extreme of Mayo island. The south part of the point is rocky and foul. H.M.S. *Perseverance* was totally wrecked here on October 21st, 1860. At one mile northward of the point the depth is 14 fathoms.

Puerta Calheta is a deep bight situated immediately south of Rocky point; there is a rock, with less than 6 feet water on it, midway between the entrance points of this bight.

South point.—The south extreme of the island is low, and terminates in a sandy point.

Blisset reef.—At 2 miles W.N.W. from South point and 2 cables off shore is a sunken reef, with 7 fathoms a short distance south of it. Saltpan point, the north extreme of English road, open south of Town point, the south extreme, bearing N.N.W. ½ W., leads clear south-west of it.

English road is a bay at the south-west extreme of Mayo island 1¾ miles wide and three-quarters of a mile deep, its entrance points bearing from each other N.N.W. ¾ W. and S.S.E. ¾ E.

Town point, the south limit of English road, is foul for a distance of 4 cables from the shore.

Saltpan point is the south-west extreme of Mayo island, and forms the north limit of English road. From the point the nearest part of St. Jago island is distant 13 miles in a W. ¾ S. direction.

Anchorage.—Vessels may anchor in English road in from 10 to 30 fathoms; a good berth is in 12 fathoms with the town bearing East. When approaching this anchorage, caution is requisite, as the bank of soundings is very steep. H.M.S. *Espoir* anchored at English road in 12½ fathoms, close off the steps in the rocks that form the east side of the bay, the western half of the shores of the bay being a sandy beach. A steam vessel may anchor 500 or 600 yards from the shore, as the wind is generally off the land, but sometimes the rollers set in, which would compel a vessel to shift out, or go to sea.*

Landing as a rule is very bad.

Supplies.—Superior cattle are bred on the island; salt is produced in large quantities, and fish is plentiful, but wood and water are scarce.

Tides.—It is high water, full and change, at Mayo island at 6 h. 30 m.; springs rise about 5 feet.

Current.—When north-west of Mayo island a south-westerly set of three-quarters of a knot per hour, in the month of October, has been experienced.

ST. JAGO ISLAND.†—The principal and south-east island of the Cape Verde group is 30 miles long in a north and south direction, with a general width of 12 miles, narrowing to 4 miles at its north extreme. Mount St. Antonio, the summit of the island, situated near its centre, is 7,400 feet high. The shores of the island are rocky, and off the east and south-east coasts are some detached rocks.

Santiago point, the south-east extremity of St. Jago island, is low and projecting, and when seen from the northward or southward appears as a long low point.

St. Francis harbour, or Portale, is the western of two bights in the coast situated immediately west of Santiago point; there are a few houses and trees, with a small stream at the head of this harbour.

Coast.—Between Portale and Porto Praya the coast is steep and rocky; a conspicuous hill (Signal post hill) is situated 1¾ miles N.N.E. from the entrance to Porto Praya.

Porto Praya,‡ at the south extreme of St. Jago, is the principal anchorage of the island; it is safe in the dry season from December to June inclusive, for vessels of any size, but during the rainy season the wind occasionally sets in strongly from the southward, with a heavy swell and short sea, that render it unsafe for sailing vessels. Vessels having occasion to visit this place during the rainy season (July to September) should anchor well out, in 17 fathoms. The bay is open to the southward, its points of entrance bearing W. ¾ N. and E. ¾ S. from each other, distant 1½ miles, and the town, situated at the head of the bay, is about one mile within that line.

The town is built on a hill about 100 feet high, with deep ravines both east and west of it; the eastern side of the harbour is high and cliffy, with numerous indentations between the town and Punta das Bicudas, the eastern entrance point; the western side of the harbour is sandy as far as

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* Commander S. Douglas, H.M.S. *Espoir*, 1860.

† *See* Admiralty plan:—St. Jago island, No. 383; scale, $m = 0 \cdot 4$ inches.

‡ *See* Admiralty plan:—Porto Praya, No. 384; scale, $m = 4 \cdot 6$ inches.

Quail island, from which cliffs extend to Punta Temerosa, the western entrance point, which is high and steep-to.

Quail island, connected to the shore by a reef of rocks, is situated in the western part of the anchorage, it is a quarter of a mile long, 200 yards broad, and 53 feet high; coal wharves have been built on the west side of this island.

LIGHTS.—The following lights are exhibited at Porto Praya:—

Quail island, south point. — A fixed *white* light, elevated 85 feet above high water, visible in clear weather 5 or 6 miles. The light tower is white, 14 feet high, and surmounted by an iron tripod, the top of which is 41 feet above the ground.

Quail island, north point.— A fixed *red* light, elevated 65 feet above high water, visible in clear weather for a distance of one or 2 miles.

The lantern is on the roof of a red house, 23 feet high, standing between two detached buildings.

Praya mole.—A fixed *red* light at the new landing place at the western part of the town, visible only a short distance.

Caution.—These lights are the property of a private company, and cannot always be depended upon.

Anchorage.—The bay may be approached with the centre of the town bearing N. by W., and steam vessels anchor abreast of Quail island in 8 fathoms, very good holding ground of volcanic sand, with the east entrance point of the bay bearing E.S.E.; the west entrance point must be kept open south of Quail island, to avoid a shoal of 3 fathoms.

There is a red mooring buoy in the centre of the bay belonging to the owner of the coal stores on Quail island, the charge for using which is 1*l.* per day.

Caution.—Strong gusts come over the land into Porto Praya during the fine season, when the breeze is fresh; therefore a vessel entering, and intending to anchor, ought to have a reef in the topsails, and be ready to clew up the top-gallant-sails at a moment's warning.

Population.—The inhabitants number about 30,000, a few of whom are Portuguese by birth, many descended from Portuguese parents, but the greater number are negroes.

Government.—Ribeira Grande, an old town about 6 miles west of Porto Praya, was formerly the residence of the Portuguese governor of the Cape Verde islands; but in consequence of the anchorage becoming blocked up (perhaps by an earthquake), the seat of government was shifted to the town of Praya.

Supplies.—Good water may be obtained from a floating tank at 8*s.* per 100 gallons, or from a Government pipe at the head of the mole, the charge for which is about 1*s.* 9*d.* per 120 gallons. Spars suitable for a lower mast of a vessel of 500 tons are procurable.

Coal can be obtained from the coaling wharf on the west side of Quail island,* and also from a coal hulk, moored 3 cables east of the north extreme of Quail island.†

Bullocks of a fair quality may be purchased.

Fruit and vegetables during the season are abundant, the oranges are particularly fine, and stock at a reasonable price.

Tides.—It is high water, full and change, in Porto Praya at 6 h.; springs rise about 5 feet.

Current.—North-westward of St. Jago island the westerly current sets frequently 1½ or 2 miles per hour.

Ribiera Grande, or Santiago, is built in a cleft of the hills 6 miles west of Porto Praya; in the fine season, anchorage may be obtained off the town in from 8 to 14 fathoms, with the flagstaff of the fort in line with the flagstaff of the old episcopal palace.

Coast.—From Ribiera Grande to Tarrafal point, the north-west extreme of the island, the coast is generally high, with a few indentations in which some houses are to be seen; the chief of these are known as Ribiera Prata and Ribiera Barca, situated respectively 8 and 11 miles south of Tarrafal point; in both of these bights supplies of fresh water can be procured.

Tarrafal point is high and steep; a small bay of the same name is situated immediately south of it.

Coast.—The eastern side of St. Jago island forms at the northern part Malaguetas bay, an open bight.

Puerto de Santiago, a cove about midway between the northern and south-eastern extremities of the island, may be recognised by its church and a group of palm trees.

FOGO ISLAND is nearly circular, 43 miles in circuit, and lies 29 miles west of St. Jago island; it is the loftiest of the Cape Verde islands, the principal peak situated at the north-east part being 9,760 feet above the sea; it is, however, generally clouded.

Anchorage.—Vessels may anchor off the town of Luz on the west side of the island, but the bottom is rocky, and the water very deep; there is generally a heavy surf on the beach, and landing is difficult.

The best anchorage is on the parallel of the town in 24 fathoms, with the north entrance point of the bay in which it is situated bearing N. by E. ½ E., and the north battery bearing E. by N. ¾ N.

Supplies.—Fruit may be obtained in the season, but water can only be procured in small quantities.

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* Shipping Gazette, November 12th, 1874.

† Annonce Hydrographique, No. 43, of 1876.

Population.—The inhabitants are of Spanish origin, and number about 13,000.

Tides.—It is high water, full and change, at Fogo island at 6h. 15m.; springs rise about 5 feet.

Currents.—Off the north and north-east extremes of Fogo island the currents are strong, and influenced by the wind.

Winds.—Vessels should not approach closely the high parts of the island, for although a strong breeze may be blowing in the offing, light winds and calms often prevail near the land.

Caution.—A rock is reported to exist off the north extreme of Fogo island; its supposed position is 3¾ miles from the shore, with the summit of the island bearing S. ¾ W.

BRAVA ISLAND.—The island of Brava is the south-western of the Cape Verde group; it is 15 miles in circuit, and lies 8½ miles west of Fogo island. Off the north extreme of the island are situated two small islets. Brava is composed of high peaks, but they are generally enveloped in mist; the shores are steep and safe to approach.

Anchorage.—There are several anchorages for coasting vessels round Brava island; they are difficult of access, and only afford supplies in limited quantities; Furna cove, on the east side of the island, 3½ miles north of the south extreme, is the best of these.

Tides.—It is high water, full and change, at Brava island, at 6h. 15m.; springs rise about 5 feet.

Rombos or Romes islets are two rocky islets each about 3 miles in circuit, lying in a W.N.W. and E.S.E. direction, 2 miles apart, but almost connected by rocks and islets. From the eastern islet the north-west extreme of Fogo bears E.S.E., distant 6 miles; and from the western and higher islet the nearest part of Brava is distant 2½ miles, bearing S.S.W.

Soundings.—The islets of Rombos are surrounded by deep water, but the ground between them is foul; clear channels exist between them and Brava island, also between the islets and Fogo.

CHAPTER VII.

RIVER GAMBIA TO ISLES DO LOS.

VARIATION in 1880.

River Gambia - - - 19° 15′ W.

West Africa settlements.—The British possessions known by this name include the settlements on Gambia river, Isles do Los, Sierra Leone, and Sherbro; the seat of government being at Sierra Leone.

In 1871 the total population numbered 37,039; the imports in 1877 amounted to 461,530*l.*, and the exports to 513,587*l.*

GAMBIA RIVER.[*]—The estuary of the river Gambia may be said to extend from Punshavel point to Bald cape, a distance of 27 miles in a S.S.W. direction; but it soon contracts to a breadth of 10 miles between Barrahdah creek (off which Bird island formerly existed) and cape St. Mary, and to a width of little more than 2 miles between Barra point and the town of Bathurst, the entrance of the river proper. Immediately above the town the river again expands to a breadth of 7 miles; at Dog island point it is 4 miles wide, at Albreda 3, and at Moota point 1½ miles, gradually diminishing from thence, till at Macarthy island[†] it is not a quarter of a mile across. This island is 150 miles above Bathurst, and though the course of the river is very tortuous and divided by several islands, yet it is navigable the whole distance; and a vessel of 10 feet draught with the aid of a pilot might proceed 70 miles beyond Macarthy island to Yahlahlenda.

H.M.S. *Seagull*, drawing 11 feet water, ascended the river to Macarthy island in April 1877; off that island the flood and ebb streams were regular, the former lasting 4 hours, the latter 8 hours, the rise of tide being 6 feet.

The depth of the channel between Bathurst and Macarthy island is subject to change, the least water found in April 1877 was 14 feet off the east extreme of Kayaye island, 5 miles below Macarthy island.

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[*] *See* Admiralty chart:—Africa, West coast, Sheet VI., Cape Verde to Cape Roxo, No. 599; also Admiralty chart of Gambia river, in 3 sheets, Nos. 608, 609, 610; scales, $m = 0{\cdot}8$ inches.

[†] Macarthy island is the limit of British jurisdiction up the river Gambia.

The British settlements on Gambia river consist of St. Mary island, British Combo, Albreda, Ceded mile and Macarthy island.

Into the northern side of the estuary of the Gambia, four other rivers empty their waters, viz., the Salm, Joombas, Fellaney, and Jinnak; the two former are of considerable size, and bring down large quantities of silt and sand, by which Sangomar bar and Red bank are formed.*

Sangomar bar lies across the mouth of the Salm river; it is situated S.S.W. distant 2½ miles from Punshavel point, carries 2 fathoms at low water, and is about 2 cables across; as spring tides rise 6 feet, vessels of considerable burden might load with facility in Salm river.

Salm river is entered by two channels; that close to Punshavel point is only available at high water for small coasting vessels, the southern channel across Sangomar bar frequently changes in direction and depth; when pass the bar the depth increases to 4 and 8 fathoms and the river is navigable for a distance of about 75 miles from the entrance.

Red bank.—This extensive bank fronts the shore between Sangomar bar and Booniadoo point, a distance of 18 miles, its western extremity lies 6 miles from the shore. The intermediate coast is low, and intersected by the mouths of the rivers Joombas, Fellaney, and Jinnak creek, being fronted by several very shallow ridges and knolls. Some of these dry at low water, and it is possible that means might be found of buoying an approach to either the north or south channels, into which the entrance to Joombas river is divided by Joom island.

Bird spit.—There is one very dangerous spot at the western extremity of Red bank that is absolutely steep-to—the soundings suddenly decreasing from 4 fathoms to 4 feet; from its position this shoal lies very near the fairway track up the Gambia. The shoalest part, that nearly dries at low water, lies W. by N. ¼ N. distant 6½ miles from Barrahdah creek, and is named Bird spit.

Caution.—Red bank is especially dangerous to approach during the harmattan season, because when estimating distances from the shore the haze makes it appear further off than it really is. Soundings are no guide, as in many places the edge of the bank rises abruptly from a flat of 4 fathoms to less than one fathom, as at Bird spit.

Soundings.—In approaching Gambia river direct from seaward, on the parallel of 13° 33′ N., the depth of 100 fathoms, fine dark sand, will be found at 50 miles west of cape St. Mary; there are 20 fathoms at the distance of 30 miles, and 10 fathoms at 18 miles west of the cape, at which latter distance, if the weather be clear, the tops of the trees will be just discernible. When the depth decreases to 6 fathoms, the vessel will be 10 miles from cape St. Mary, and the same distance from Bald cape, when in clear weather the land about them should be seen. The general depth between this position and African Knoll is 4½ to 5 fathoms, but two or three 4-fathom shoals exist, as also one of 3 fathoms, from which African Knoll buoy bears E. ½ S., distant 2 miles. As a general rule, the nature of the bottom on the northern side of the entrance to the Gambia is mud, and that on the southern side is sand, or sand and mud mixed.

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* *See* Admiralty plan:—Salm and Joombas rivers, No. 607; scale, $m = 0{\cdot}7$ inches.

DANGERS.—Horse-shoe bank, the north-western danger at the entrance of the Gambia, is about 5 miles in circuit, and reported to have only 12 feet on some parts of it. The bank is convex at its south-west extreme, from which cape St. Mary bears S. ¾ E., and African Knoll S.E. ½ E., each distant 8 miles.

Bijjols islands, situated north-west of Bald cape, are two small islands, covered with grass, and surrounded by reefs of rocks, which extend 2 miles west of them, and on which the swell always breaks. Some of these off-lying rocks uncover at half-ebb, and there is a depth of 2 and 3 fathoms at a quarter of a mile form their western extreme, which bears W. ¾ S. distant 14 miles from cape St. Mary, and 4 miles N.W. by W. ⅓ W. from Bald cape; the coast between Bijjols islands and cape St. Mary is fronted by sunken reefs, extending in some places a considerable distance from the shore.

St. Mary shoal is a narrow shallow bank, extending 5 miles in a N. by W. direction from Bathurst.

Between St. Mary shoal and the north side of St. Mary island the water is shallow.

A shoal, on which there is a depth of 12 feet, lies 1¼ miles north-west of the north extreme of St. Mary shoal; from the shoal African Knoll buoy bears E.N.E. distant 2⅓ miles.

African Knoll is the northernmost of the shoals which lie off the south entrance point of the Gambia, it has 12 feet water over it, and deep water all around; it is half a mile in length N.W. and S.E., and 150 yards wide; a black buoy is placed on its north-west side in 5 fathoms The main channel of the Gambia is here two thirds of a mile wide, the narrowest part being between the knoll and the flats off Jinnak creek, in a N.E. by E. ½ E. direction from the buoy, or with the buoy in line with cape St. Mary.

Middle ground is a bank of 15 feet, about 2 miles long, situated midway between St. Mary shoal and African Knoll, with a passage on either side of it, but only local craft should use them.

BUOYS.—The entrance to Gambia river is marked by four buoys, the Northern, off Bird island bank; Fairway buoy, off Horse-shoe bank; Middle buoy and the African Knoll buoy. They are however not to be depended on either for positions or colours.

Northern or Red bank buoy is painted *red*, surmounted by a black cage, and lies in 5½ fathoms, with cape St. Mary bearing S. by E. distant 13 miles, and Fairway buoy S.S.W. ½ W. distant 5½ miles.

Fairway buoy is painted chequered black and white, surmounted by a white cage, and lies in 4¾ fathoms, with cape St. Mary (centre of red cliff) bearing S.S.E. ¾ E. distant 9⅙ miles, and Middle buoy E. by S. ¾ S. distant 5¾ miles.

Middle buoy, painted *red* and surmounted by a black cage, lies in 4¾ fathoms, nearly midway between Fairway and African Knoll buoys, with cape St. Mary bearing S. ½ W. distant 5¾ miles, and African Knoll buoy E. by S. ¾ S. distant 6¼ miles.

African Knoll buoy is painted black, surmounted by a cage, and lies one cable off the north-west part of the African Knoll in 5 fathoms, with cape St. Mary bearing S.W. by W. ½ W. distant 6 miles, and the flagstaff at the north extreme of Bathurst S. ¼ W. distant 7⅙ miles.

ST. MARY CAPE is the north extreme of the western entrance point of the estuary of the river Gambia, it bears from Punshavel point S. ½ W., distant 21 miles. Foul ground extends east and west of the cape, but at 2 miles N.N.W. from it, there are 5 fathoms. The cape is about 50 feet high, composed of red cliffs and capped by cocoa-nut trees, which, with the white house for convalescents on it, render it distinguishable at some considerable distance, whilst on the northern side of the entrance to the river on the contrary, there is nothing to recognise, as the coast is covered by bush, and as a rule nothing can be distinguished but the larger trees in the mirage.

Making the land.—The best parallel on which to approach the entrance of the Gambia is 13° 31′ N., (that of cape St. Mary,) or 13° 33′ N., as the land about the cape is quite distinct in character from the other portions of the coast, and higher. If cape St. Mary is made, and the convalescent hospital distinguished, there need be no difficulty in picking up African Knoll buoy without a pilot, as the vessel's position can be placed on the Admiralty chart by bearings of Bald cape, cape St. Mary, Bathurst and Barra points, and the entrance to Jinnak creek.

The coast is generally very low, and there is no good natural mark that would justify a stranger in a sailing vessel proceeding beyond African Knoll buoy, without a pilot or some local knowledge.

Outer anchorage.—If the buoys cannot be made out, a vessel should anchor in 5 fathoms, off the convalescent house on cape St. Mary, and, if necessary, send a mounted messenger to Bathurst for a pilot.

Landing.—During the rainy season landing can be effected on the sandy beach southward of cape St. Mary; at other seasons the breeze sets in fresh from the sea, creating a surf that renders landing unsafe.

From the northward.—After passing cape Verde, bring cape Manuel lighthouse to bear North, and maintain a South course, allowing for the current according to the season of the year (*see* page 12); the soundings should be frequently verified, and the depth not decreased to less than 10 fathoms till near the parallel of 13° 33′ N., when the entrance should be made from the westward.

From the southward.—The great dangers in making Gambia river from the southward are the Bijjols islands, but the land adjacent to them being high, a good estimate may be formed of its distance, and by not reducing the depth of water to less than 6 fathoms, a safe distance from the rocks will be ensured. After passing Bald cape and Bijjols islands, a position north of cape St. Mary should be sought, from whence measures could be taken to enter the river, or to anchor and obtain a pilot; in hazy weather with an ebb tide, great care will be necessary to prevent being set too far towards Horse-shoe bank. In passing westward of Bijjols islands, if the flood stream is running, the soundings should not be decreased to less than 8 fathoms.

If the buoys are in position and can be made out, there is no difficulty in entering or leaving the Gambia without a pilot in a steam vessel of moderate draught; a vessel of over 24 feet draught should if possible take a pilot, as in consequence of the heavy rains bringing so much deposit down the river, the shoals vary in their positions, and the depth of water over them is often somewhat different from that shown on the Admiralty chart.

After rounding African Knoll on the north side, steer for fort Bullen on Barra point, until past Middle ground, when a course may be steered for Bathurst, but the water should not be shoaled under 6 fathoms. During the greater part of the year, when the trade-wind blows from N.W. and N.E., a vessel may enter under sail, and vessels of war of 10 feet draught find no difficulty in beating in or out, with a favourable tide.

Caution.—On no account should an attempt be made to enter the river without a pilot until African Knoll buoy is made out, and it should be borne in mind that the flood sweeps rapidly past Bathurst; also that both ebb and flood set towards African Knoll and Middle ground.

Bathurst.—From cape St. Mary the coast trends S.E. by E. for a distance of 6 miles, terminating in a sandy point, that forms the western entrance point of the Gambia, and on which is built the town of Bathurst; midway is the entrace to Oyster creek, that, communicating with the river 3 miles above Bathurst, forms the island of St. Mary.

Bathurst was founded in 1816. The European houses are large and surrounded by gardens; those of the natives are small and thatched; the population is estimated at 8,000 or 9,000 inhabitants, A merchant steam vessel makes regular trips between Bathurst and Macarthy island.

Barra point (on which fort Bullen is built), is the eastern entrance point of the river Gambia; it bears from Bathurst, its western entrance point, E.N.E. distant 2⅓ miles; on that line the navigable part of the channel is 1½ miles wide. Barra point bears from Punshavel point S. by E. ¼ E. distant 24 miles.

Anchorage.—A good berth for vessels of war, within the influence of the sea breeze, is abreast of Government House at Bathurst, in 10 fathoms, with the flagstaff in the garden just open westward of the flagstaff in the fort; or a berth may be taken northward of Government House, about 2 cables off shore, near St. Mary's shoal, in 7 fathoms, with fort Bullen bearing N.E. by E., and the east extreme of Bathurst bearing S.S.W. A vessel should either moor, or lie with a long scope of cable, as the constant swinging makes a foul anchor almost a certainty, if riding with little chain out.

Pilots.—Pilots for the river Gambia can be obtained at Gorée.

Climate.—The rainy season, when the land and sea breezes are not regular, is the most unhealthy; but the rains are not heavy or continuous as at Sierra Leone. H.M.S. *Philomel* remained a fortnight in the river in July 1862, and the ship's company were perfectly healthy; one cause of which immunity from sickness was probably owing to the vessel going out to the African Knoll buoy from Saturday until Monday, a course recommended to all cruisers when detained in the Gambia.*

Population.—In 1871 the population of the settlements on the Gambia numbered 14,190. The imports in 1876 amounted to 89,356*l.* and the exports to 86,216*l.*

Tornadoes.—Severe tornadoes of short duration occur in July.

Supplies.—Beef and fowls of inferior quality may be had; vegetables and fruit are usually very scarce; the water at Bathurst is brackish, and difficult to obtain; a better quality may be had at Jillifree, 16 miles above Bathurst, on the right bank of the river, but vessels fitted with condensers are recommended not to use the water from the shore.

Coals.—The coal store is situated at the south extreme of the town, where a shelving beach renders flat-bottom boats necessary to expedite coaling.

Fish are very abundant at the north side of the entrance.

Leaving Gambia river.—The best time to weigh from Bathurst under sail is on the last of the flood, so as to gain mid-channel before the full strength of the ebb, which, as it sets directly down upon the Middle ground, would in light winds make it necessary to anchor in order to avoid it. This would cause the loss of a day's tide, unless the sea breeze should come in sufficiently strong to enable the vessel to weigh again, and to stem the ebb; with that chance in view, if obliged to drop the anchor, it should be done sufficiently soon to preserve room for weighing. Further down the channel the sea breeze from north-westward is always a beating wind, and even the land breeze in the morning is seldom sufficiently to the eastward, to lead out without making a tack, especially as when it is most favourable it has the least strength, and consequently the tide will have the more time to exercise its influence.

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* Commander Wildman, H.M.S. *Philomel*, 1862.

After weighing, stand over towards Barra point, keep the lead going, and make very short tacks off the bank on the eastern side of the channel, especially when nearing African Knoll, where the set of the ebb tide is always the strongest. To avoid that Knoll, remember, when the two projecting points of sand on the north side of the mouth of Jinnak creek, come in line with the intermediate projection from the southern shore, bearing E. ½ N., the vessel will be fairly to the northward of African Knoll, and a course out to sea may be at once shaped.

Tides.—It is high water, full and change, at Bathurst at 8h. 10m., but the stream continues to flow 1½ hours after the tide has ceased rising by the shore; the range of tide varies from 6 to 9 feet, the latter being the effect of the freshes during the period of rains. The velocity also varies much, and frequently without any apparent cause. The ebb stream, diverted by Barra point, sets strongly down upon St. Mary shoal, while the main stream runs over Middle ground. In mid-channel, west of African Knoll, the ebb stream sets directly to seaward; but near the northern shore it is variously affected by the tide from the creeks, and from the rivers Joombas and Salm, before they unite and take the general direction of the coast.

Coast.—From cape St. Mary to Ball cape is about 11 miles in a general W.S.W. direction; and at 2½ miles further south-west there is another projecting point, with a reef extending west from it about a mile, and with a rivulet of fresh water on its south side. From this point the coast trends S. ⅝ W. for a distance of 13 miles to the river St. Pedro, and from thence S. by W. ¾ W. for 32 miles to the entrance of the river Casamanze.

The general colour of the coast about cape St. Mary is variable, becoming white to the westward of the cape, and then reddish, and further southward changing into gray sand. Bald cape may be readily known by a high tree in form like an umbrella, and a large square bush about half a mile further southward. Between Bald cape and the river Casamanze the coast is very low, with a sandy beach covered with trees, which in the vicinity of St. Pedro river appear from a distance like a continued forest, with lofty clumps resembling islands. The water is very shallow, the bank suddenly curves outwards, and abreast of Souta river in lat. 12° 44′ N. and 17 miles from the shore, there is a 4-fathoms bank of 5 or 6 miles in length, lying in a N.E. and S.W. direction.

Bliss river situated 12 miles north of the entrance to Casamanze river, Souta river 3 miles south of Bliss river, and Oyster river 6½ miles south of the same, all communicate with Casamanze river, but their entrances are obstructed by sand banks.

CASAMANZE RIVER.—Off the entrance of Casamanze river there is a depth of only 4 or 5 fathoms at the distance of 8 or 9 miles from the land, and at 10 miles distant there are 7 or 8 fathoms; at 11 miles from the north entrance point, in a W. by S. direction, there is a bank of 4¼ fathoms; the 10-fathoms line of soundings passes about 25 miles outside of the mouth of the river, and the 100-fathoms line is about 40 miles W. by N. from cape Skyring.

The entrance to Casamanze river is not easily recognised from the offing; it lies between Djoqué island on the north and Guimbering island on the south; the Grand bank of Casamanze, composed of hard sand with 5 or 6 feet water over it, lies between these islands.

The land on the northern side of the entrance is low and wooded, without any distinguishing marks.

The northernmost elevation on Guimbering island is rendered conspicuous from the offing by a white patch; there is an umbrella-shaped tree between this and the north extreme of the island.

From the north-west part of Guimbering island, shoals extend 2¾ miles from the shore. The principal French settlement at Casamanze river is situated on Carabane island, on the south shore of the river, 3½ miles within the entrance.

Directions.—The channels across the bar of Casamanze river vary greatly in depth and direction; in 1876 the only available channel was that known as Djoqué pass, which lies close round the south exteme of Djoqué island, and in which the least depth was 8 to 9 feet, the sea in this channel is nearly always smooth.

Pilots.—A pilot station has been established on the south extreme of Djoqué island.

Anchorage.—Vessels while waiting for a pilot should anchor outside the bar in 4 fathoms, with the white patch on Guimbering island bearing S.S.E. ½ E. and the umbrella tree bearing S.E.

Off Carabane the anchorage is 3 cables from the shore, in 8 fathoms, mud.

LIGHT.—A fixed *red* light is exhibited at Carabane island; it is elevated 52 feet above the quay, and should be visible in clear weather for a distance of 6 miles.

Zinghinchor.—At 25 miles up the river Casamanze, on the southern bank, is situated the French factory of Brin, and 9 miles farther on the same side, at Zinghinchor, the Portuguese have an establishment. A considerable depth of water may be carried up as far as that place, and the river is navigated by large schooners much farther. There are several well-cultivated rice plantations near the shore, and some scattered huts.

Segdhiou, situated about 90 miles above the bar of Casamanze river, is a flourishing French settlement. Vessels drawing 6 feet can ascend the river as far as this.*

Winds and weather.—Winds from E.N.E., N.N.E., and N.N.W. prevail during the dry season at Casamanze river (October until May); variable winds chiefly from a westerly direction prevail during the remaining months of the year.

Moderate rains and calms precede the rainy season (May–October); tornadoes blow at the commencement and end, but are most frequent at the former period. Heavy rains are experienced during July and August. Thick fogs are of common occurrence at all seasons of the year.

Skyring cape.—At about 9 miles southward of the river Casamanze there is an elbow of low reddish cliffs which interrupts the beach, and which has been named cape Skyring; it marks the place where the commander of that name lost his life, on the 22nd of December 1833, while engaged in the survey of this coast. The adjacent bight in the shore, where the boats where lying which rescued his mangled body, was named Murder bay.

Roxo cape.†—From cape Skyring the coast trends S. by E. ½ E. for a distance of 4 miles to cape Roxo, that forms the north-west limit of the approach to Cacheo river. The cape, when bearing about E.S.E., presents the appearance of downs of white sand, moderately high and covered with bushes. At 2 or 3 miles northward of this cape the country is well wooded, and of a tolerable height, which it preserves for an extent of 9 miles. On one of the points formed by the coast there are several red patches, from which the cape has probably derived it name, but the cape itself is a low sandy point, covered with trees and bushes.

Barella cape, with its somewhat higher range of trees, lies S.E. ¼ E. distant 8 miles from cape Roxo, and half-way between them there is an indistinct opening in the beach, named Soobijack creek. Barella cape presents the appearance of white sandhills and reddish cliffs of clay, and from both this cape and cape Roxo, reefs a mile in length project to the southward.

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* The minimum temperature of the year at Segdhiou is 82° F.—*Bulletin Soc. Geog. Jan.* 1878.

† *See* Admiralty chart;—Africa West coast, Sheet VII., Cape Roxo to Isles do Los., No. 600.

CACHEO RIVER.*—Jufung point, low and wooded, is situated 8 miles south-east of Barella cape, the intermediate coast being very low, with the appearance of being intersected by small rivers or creeks, and fronted by a broad shallow flat. At Jufung point the low wooded coast turns to the eastward for 5 miles to Bolola point, from which cape Mata bears S.E ½ E. distant 5 miles, these two latter projections forming the entrance points of Cacheo river.

Bolola point is low, with some lofty trees situated 2 miles west of it. At this point the shore abruptly turns to the northward, forming Caton bay, on the west side of which stands Bolola, a large village on the beach, and an intricate channel may be found, carrying 5 fathoms, leading close up to the houses. The ground in the neighbourhood of the village is low and swampy, with extensive plantations of rice.

Caton bay is 2 miles in breadth at the entrance, and from the head a deep creek opens to the north-east, which is said to communicate with the river Casamanze, at Zinghinchor.

Cacheo banks.—The triangular space enclosed by the shore, and by lines drawn to the southward from cape Skyring, and to the westward from Jufung point, is full of shallow banks and irregular shoals, on many of which the sea breaks furiously :—Coimbra bank, 5 miles S. ¾ W. of cape Roxo; Falulo breakers, 5 miles farther off-shore on the same bearing; Barella breaker, eastward of the latter; and Jufung breakers, which extend 6 miles westward from Jufung point, may be termed the northern group; while to the southward of the Direct channel into the river are situated Cacheo spit, Cacheo bank, Cacheo breakers, Parcels breakers, Cachops breakers, Garamas spit, and Mata and Domingo banks.

Channels.—Two main channels lead from seaward to Cacheo river, the northern, known as the Direct channel, carries a depth of 12 feet at low water, and the southern, termed the South-west channel, carries 15 feet at low water.

Direct channel.—The point at which a vessel must enter this channel is 13 miles from the nearest land about Barella cape, and 16 miles from Jufung point; and to make anything like a straight course through it, being out of sight of all marks, several shoals of 2 and 2½ fathoms at low water must be crossed. As the highest tides do not rise more than 7 or 8 feet, a vessel of a certain draught only, can with any propriety attempt it; and the best manner of proceeding will be to run in for the land somewhat to the northward of latitude 12° 20′ N. so as to distinguish the red cliffs between capes Skyring and Roxo, but not approaching it in less water than 5 fathoms, nor to a less distance than 2 or 3 miles. Then steer S. by E. ½ E. till abreast of cape Roxo, so as to see that point with certainty, for as its termination is low and sandy, and, like the other parts of the coast, covered with bushes, it does not appear well defined at a distance. Having now that cape on the port beam or bearing about E. by N., a look-out at the masthead for broken or discoloured water, leadsmen in both chains, and being ready to haul out if they should call less than 4 fathoms, steer S. by W. for 11 miles, making due allowance for the deviation of the compass, which for such navigation, ought to have been previously carefully ascertained at some convenient anchorage.

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* See Admiralty chart :—Cacheo river, No. 1,722; scale, $m = 0{\cdot}5$ inches.

During this course the soundings will probably indicate when passing over the tail of Coimbra bank, the heavy Falulo breakers will be plainly seen, and at the end of the 11 miles the vessel ought to be in the fairway of the channel, in latitude 12° 8′ N., and in 6 or 7 fathoms water. At this point, however, it would be prudent to anchor, in order to verify the latitude by observation, to wait for the sea breeze, or to take the commencement of the flood tide and if practicable, to get out a couple of boats ready to send ahead with danger flags, in case of becoming entangled among the shifting sands which are found in the entrance of all rivers of this kind.

To enter.—These precautionary arrangements having been made, the weather being tolerably clear, and an anchor ready to let go, with a range of 10 or 12 fathoms of cable, the vessel may steer E. ¾ S. southerly. For a distance of 7 or 8 miles the depth of 6 or 7 fathoms will be preserved; Jufung breakers, which may be seen on the port bow, will be passed in 4½ fathoms, at the distance of half a mile, and their south-east sandy prong will have to be crossed in 2 fathoms. The water will now suddenly deepen, the land will have been for some time in sight, and the high trees of Bolola should be made out and brought ahead, on the bearing of E. ½ S., and kept so till within about 2 miles of the beach. Then alter course nearly a point to starboard, but still closing the shore, so as to keep in the deep but narrow channel northward of Domingo bank, and run parallel to the beach (off which some rude fishing weirs may be observed), till the low point of Bolola bears N.E, distant about a mile. If the vessel draw no more than 12 feet, steer S.E. by E. ½ E. from thence for cape Mata, till the main channel of the river is reached; but if requiring deeper water it will be prudent to anchor and send boats to examine the best track across the bank or bar, which unites Domingo bank to Caton flat.

Anchorage.—Having crossed this bar, and now fairly entered the river, anchor in 6 or 7 fathoms, on good holding ground between Bolola point and cape Mata, or pursue the voyage to Cacheo or farther up, according to the objects in view.

Nature of bottom.—There is a satisfactory rule which applies to the entrance of the Cacheo, as well as of all the rivers on this part of the coast of Africa, and which the seaman should bear in mind; that in the channels the bottom is always of soft mud, but on the banks always of hard sand; and, therefore, the lead in a careful hand will give immediate notice of any deviation from the fairway.

South-west channel.—The above are the best rules which can be given for entering Cacheo river by the Direct channel, an enterprise requiring great coolness and promptitude, and which should be attempted only under favourable circumstances, and in a manageable vessel. But as there is reason to believe that the banks which form that channel are not stationary, and that they frequently change both in shape and extent, it will be proper to give the mariner the choice of another entrance, which, though more circuitous, and equally surrounded by dangers, has somewhat deeper water, and offers better opportunities for a retreat in case of unforeseen difficulties.

Directions.—To take the south-west channel, make the land between capes Skyring and Roxo, as before directed; approach it within 5 or 6 miles or into about 6 fathoms; run along shore till cape Roxo bears E. by S. ¾ S. so as to be sure of the position, and then haul off to make a S. by W. ¾ W. course, allowing for tide, current, and swell, and pursue this course for 19 or 20 miles. If the deviation of the compass be known, and the above allowances fairly made, at the end of this run the vessel will be in latitude 12° 0′ N., and in 7 or 8 fathoms water, and will have passed well outside all the banks, although the lead will probably show the change of a fathom or two in the soundings when crossing their tails. Here it will be prudent to anchor, in order to verify the latitude, and to wait for the sea breeze, a flowing tide, and sufficiently clear weather, as well as to make all those arrangements which were recommended for the former channel, and which are so necessary in such intricate navigation.

Supposing that everything has turned out favourably, weigh, and steer E. by S. ¾ S., for a distance of 15 or 16 miles, allowing for the oblique set of the flood tide. During this run the Parcels breakers will probably have been discerned from the masthead, and the Cachops breakers will be more certainly seen, in passing them at a distance of two or three miles on the port beam. The water will have been gradually shoaling, so that by this time the depth will be reduced to nearly 5 fathoms, and unless the weather should have become hazy, the low land will be seen ahead, and Cayo islands bearing S.E. ¾ S.

The three points on which the mariner has to rely for a knowledge of his position, are, the sight of Cachops breakers, the distant bearing of Cayo islands, that are situated at the dividing point of Cacheo and Jeba rivers, and the fact of having arrived at the (low water) depth of 5 fathoms. From this position steer up the south-west channel, N.E. ¾ E., or N.E. ½ E., or farther to the northward, according to the state of the flood. The

Admiralty chart will show, if these banks do not materially alter their positions, that in making a straight course up this channel, the vessel will have to cross both the eastern prong of Cachops breakers, and the long spit which projects from Garamas island, and will, therefore, at each of those places lessen the depth of water for a cast or two of the lead to 2½ fathoms; but if the vessel be under good command, a judicious yaw will keep her in a proper depth. About 8 miles of this N.E. ¾ E. course will lead to the edge of the bar, that has generally 2½ fathoms at low water springs, and as the tide will have been for some time rising, it will be probably crossed in more than 3 fathoms, unless the swell should be very heavy. But before reaching the bar, the high trees to the westward of Bolola point will be seen from aloft, and should be brought ahead on the bearing of N.E. ¾ E. Garamas island will also be seen, and ultimately cape Mata will rise upon the starboard bow.

Anchorage.—The bar being crossed, the lead will suddenly drop into 6 or 7 fathoms; the vessel will be in the main channel of Cacheo river, with the low point of Bolola bearing E.N E. distant 5 miles, and cape Mata E. ½ S. distant 8 miles, the course must then be immediately altered to E. ⅓ S. till abreast of Cape Mata, or in such a berth as it may be thought proper to take. From abreast of cape Mata, the course up Cacheo river is about E.N.E. for a distance of 11 miles, as far as the old Portuguese fort of Cacheo. To this position the lead will be found a safe guide, and any vessel may safely anchor off the fort in 5 fathoms, on good holding ground. The shores are everywhere covered with mangroves, which grow in the water, and which render landing impracticable, except at a few spots. In 1869 Cacheo was declared a free port.

Sara bank.—It is apparent from the Admiralty chart, that as soon as the two entrance capes are passed, all difficulty vanishes, and that vessels of any draught may freely proceed, not only to the fort of Cacheo, but to Farin, which is situated 100 miles from cape Mata, by keeping in mid-channel, and, as in all other rivers, by avoiding the points. In that whole space there is but one danger, viz., a bank which fronts the northern shores east of Sara creek, 13 miles above Cacheo fort, which projects a little more than half-way across the river, and which may be easily avoided by borrowing on the southern shore. The flood tide is scarcely felt above Salsang, 50 miles from the mouth of the river, and the ebb stream is not very strong in any part of the river, except towards the end of the rainy season (about December).

Farin stands on the right bank of the river, 85 miles from the entrance; it is but a small place, with few native inhabitants. The appearance of H.M.S. *Raven* (1834) produced no little alarm among them; a few refreshments were easily obtained, and as the rapids are only a short distance higher up, the water alongside was pure and good. The freshness of the climate was invigorating, after the sickly heaviness of the atmosphere, from which her crew had greatly suffered when lower down the river, but the unfriendly habits of the natives forbade much intercourse; at Salsang, likewise, the same hostile spirit displayed itself.

Near Farin the mangrove entirely disappears, the country becomes clear, a gently-rising tract of fertile soil commences, and a few scattered cotton plantations may be seen in the vicinity of that village. It is said that there is easy and constant communication from hence to Bissao, and to Casamanze and Gambia rivers.

Batoor is the largest town on the river, situated 70 miles from its mouth, and the inhabitants are the most civilized; they are all Mahommedans, and of the Mandingo tribe, which is the most powerful of the numerous tribes that have possession of this country.

At the town of Batoor the clay soil is visible between the mangroves, the shores become steeper and rocky, and good-sized forest trees, including the mahogany, are seen on the banks.

Tides.—It is high water, full and change, on the bar of Cacheo river at 7 h. 45 m.; springs rise 8 feet. The ebb stream in the Cacheo, as also off it, sets to the N.W., and the flood to the S.E. The ebb generally runs 8 hours, while the flood rarely runs more than 4, nor can it generally be considered a regular flood tide, but merely a slack water or cessation of the ebb. Towards December, after the rains are over, and the harmattan season has set in, the wind generally blows very strong from N.E. to E.S.E., which tends considerably to strengthen the ebb stream, and during that season vessels at anchor rarely swing to the flood.*

Jatt shoals.—About 20 miles of a low forbidding shore, with very shoal water off it, separates the river Jeba from the Cacheo, or, in other words, extends to the southward from cape Mata to Cayo point. In that space, about midway, the Jatt shoals, which project 10 miles north-west from the mouth of Jatt channel, terminate in a shoal, which always breaks; a flat on which there is less than 3 fathoms, extends 5 miles westward from Cayo point.

Cayo islands.—The Cayo islands are situated 38 miles S. by E. ½ E. from cape Roxo; they lie close to Cayo point, appearing at a distance like three small hummocks, but at low water their bases unite; they are not high, but being covered by dark lofty trees stand out very conspicuously at times from the low land behind them, and form the principal landmark for approaching the Jeba. They lie in lat. 11° 50′ N.

JEBA RIVER.—The Jeba is a much larger river than the Cacheo, its mouth being 15 miles wide, in a S. by W. direction, from Cayo point to Carashe island, the north-western of the Bijouga group; at 90 miles eastward of Cayo point it has a breadth of 4 miles. There are many dangerous banks in its entrance, as well as higher up, but they may be easily avoided, and it is not traversed by any shallow bar. The usual channels by which Jeba river is entered are Jeba channel, leading to Bissao channel on the northern side of the estuary, and Orango channel, leading to Kanabak reach and Bulama and Arcas channels on the southern side.

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* **Commander T. Miller, H.M.S. *Ranger*, 1850.**

Above Bissao the channel of the river is obstructed by numerous shoals, the passages among which is only available for small vessels.

The periodical rise of Jeba river commences in July, the waters begin to fall about the middle of September and continue falling until the end of October.

Bijouga or Bissagos islands.—This extensive group of islands is situated in the estuary of Jeba river, dividing the northern and southern approaches. It was partly surveyed in 1826–34, but not sufficiently examined to enable strangers to make free with the various channels by which it is intersected; nor is it likely that there will be any inducement for vessels to penetrate its interior waters, or to have any farther intercourse than may be afforded by the open channels of Jeba and Orango. Besides a few bare or unproductive rocks, the whole cluster consists of 13 islands, occupying a space of about 50 by 35 miles. They are all volcanic and highly fertile, although, as far as could be perceived, generally deficient in water; from various causes they are probably healthier than the mainland. Most of the islands are inhabited; the men are active and powerful, but proverbially revengeful and treacherous, and appeared averse to any species of barter or exchange, so much so that it was with great difficulty that the *Ætna* obtained a few fowls; nothing but firearms and powder seemed to tempt them.

Their houses are circular, and built of stones and mud; the doors are low, and there being no windows, they are insufferably dark and hot, though they are well thatched, with broad projecting eaves. Their canoes are large and clumsy, and would contain easily 30 men with paddles. No attempt seems to be made to employ sails.

Shoals and foul ground extend for a considerable distance west and south of Bijouga islands, which should be approached with great caution.

Bijouga breaker.—A small bank, on which the depth of water is from 12 to 18 feet, is situated W. by S. from Cayo point distant 39 miles; from the shoal cape Roxo bears N.N.E. ¾ E,. distant 50 miles, and the nearest land (Carashe island) bears E. by S., ¾ S. distant 28 miles.

A shoal, on which the depth of water is 12 feet, lies S.E. ½ S. from Bijouga breaker, distant 5 miles.

Warang bank.—This bank, which partially dries at low water, lies off the western entrance to Warang channel; it extends 7 miles in an east and west direction within the depth of 3 fathoms, and its western extremity bears W. by S. ½ S. from Cayo point, distant 25 miles.

Remarks.—During the harmattan season, when steering for the Bijouga islands, or navigating the channels between them, the reckoning and lead will be found the best guides, the land being difficult to distinguish from a distance of more than 3 miles.

Most of the banks in Jeba river, and among the Bijouga islands, are composed of hard sand and are steep-to, so that the unceasing use of the lead is even less efficient in giving warning by the actual depth of the water, than by showing the nature of the bottom, which in the channels is generally of soft mud, and round the edges of the banks of hard sand; therefore instant attention should be paid to the change thus indicated.

Jeba channel.*—The entrance to Jeba channel is obstructed by Cayo, Middle, and Carashe banks; of the four channels formed by them the northern, known as Cayo channel, is the only one recommended for large vessels.

Cayo bank, about 8 miles long within the 5-fathom line in an E.S.E. and W.N.W. direction, is narrow and has over it a general depth of 4 fathoms, but in one place, bearing S. ¼ W., distant 4 miles from Cayo islands, it rises into a knoll of sand with only 12 feet upon it.

Middle bank is also a narrow bank parallel to Cayo bank, and about 5 miles long within the depth of 5 fathoms; the least water on this bank is 3 feet, and it lies about three-quarters of a mile south of Cayo bank.

Carashe bank lies about 2½ miles south of Middle bank; the eastern part is marked by heavy breakers, and a shoal of 12 feet water lies near its western extreme.

Arlett point, though very low, may be recognised by a village near the shore; it lies S.E. ¼ S. from Cayo islands, distant 14 miles. In the space between, the wide opening of Catherina bay will be seen; the head of this bay unites with the channel round Jatt island, and, with Balantes bay and Martinho and Bissao creeks, divide the right bank of Jeba river into a series of large islands.

Arlett bank, on the western part of which there is only a depth of 15 feet, extends in a N.W. by W. and S.E. by E. direction for a distance of 3 miles within the depth of 3 fathoms; the western edge of this bank lies West, distant 2¼ miles from Arlett point.

Balantes bay.—Biombo point which is low, but safe to approach on its southern side, forms the eastern entrance point of a deep inlet between Arlett and Biombo points, and which is known as Balantes bay.

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* *See* Admiralty charts:—Bijouga islands and river Jeba, sheets 1 and 2, Nos. 1.726. 1,724.

The entrance to this bay is obstructed by shoals, on the western part of which are situated Ancora islands.

Ancora islands are three in number, the western is very low, the southern is marked by a conspicuous tree on the summit.

Martinho bank, which is a narrow but steep ridge, and the more dangerous as it seldom breaks, though carrying only 6 feet at low water, lies S.E. by E. from Biombo point, distant 5 miles. There is a passage between this bank and the flats off Martinho creek, but unless in a case of the greatest necessity, all vessels should keep out in the main channel or south of Martinho bank. When in 10 fathoms, at about a mile southward or the bank, Biombo and Martinho points bear N.W. and E. by N. ¼ N., and therefore, in proceeding up or down the river, a vessel should not borrow on the bank by parting with the one bearing till the other be obtained.

St. Martin grove is a conspicuous clump of trees situated one mile inland, at 6 miles eastward of Martinho point; a conspicuous isolated tree is situated 1¾ miles west of St. Martin grove.

Directions.—The obvious rule for entering by the northern channel (Cayo channel) is to get into the latitude of Cayo islands, or a mile or two farther to the southward (11° 48′ N.), and steer E. by S. ¾ S., across Great Jeba flat in 8, 7, and 6 fathoms, till Cayo islands are seen ahead, or a little on the port bow: or, if the vessel is coming from the northward, and has had an opportunity of making cape Roxo satisfactorily, an equally sure method of hitting the entrance will be to bring that cape to bear E. by S. ¾ S. distant, about 6 miles; then, allowing for the tide, steer S. by W. ¾ W. for a distance of 20 miles, which will place the vessel in lat. 12° 0′ N. and in 8 fathoms water; from this position steer S.E. ¼ E., and the soundings will indicate a gradual approach towards the edge of Jatt flats; this course will lead safely to a position within sight of Cayo islands.

Cayo islands should be passed in 6 or 7 fathoms, at a distance of not more than 2 miles, in order to pass north of Cayo bank; from this position steer S.E. ¼ E. which will lead south of Arlett bank, from whence an E.S.E. course will lead across the broad mouth of Balantes bay, in a depth of 10 to 20 fathoms, though over very uneven ground, passing 1¾ miles south of Ancora islands.

Anchorage.—Having entered the river in the evening, a safe berth to wait for daylight is in 14 fathoms off Balantes bay, with Biombo point bearing E. by N., and Ancora island bearing N.W. ¾ N.

To proceed.—From a position in 10 fathoms, at one mile south of Martinho bank, the course may be altered to a little north of East, so as to keep near the northern shore, to avoid too near an approach to the suspicious flats which project from Gancho banks; a run of 13 miles through irregular soundings of 10, 5, and 12 fathoms, will take the vessel abreast of Bernafel point, which, on account of a shallow spit, should be passed in 7 or 8 fathoms, or at a distance of 1¾ miles. By this time the town and fort of Bissao, and the two conspicuous islands Passaro and Rey will have been seen; by opening the latter half-way out to the eastward of the former (bearing about N.E. by E.), the spit will be avoided, and a clear course offered to the anchorage. Run along the eastern side of Passaro island, which seems to be quite safe at the distance of half a mile, and steering for Bissao fort, anchor either half-way between the islands or proceed at once to the town, off which a good berth may be taken in 7 fathoms, mud, with the fort bearing N.N.W., and Rey island between S.E. by S. and East. It is necessary to remark that there are short spits extending from the north-east and south-east extremes of Passaro island, and from the south-west extreme of Rey island, and that from the latter island an extensive bank extends to the north-east.

Bissao.—The fort of Bissao is a square building with four bastions and several guns, and stands about 200 yards from the beach. The Portuguese have a garrison there, consisting chiefly of convicts and mulattoes, except the officers, who are detached from the Cape Verde islands, of which this settlement is a dependency. In 1869 Bissao was declared a free port. There appears to be no territory attached to the port, but at 40 miles farther up the river the Portuguese have a thriving factory, and another on Bulama island. The whole island of Bissao has the appearance of being extremely fertile, and the population is proportionally great. It is divided among several independent chiefs, the most powerful of whom resides in the large native town adjoining the Portuguese fort, which contains 6,000 or 7,000 inhabitants.

Supplies.—Refreshments of all kinds may be obtained, but generally at high prices. Rice, maize, yams, and several kinds of fruit, such as bananas, water melons, limes, oranges, &c., are cheap, especially if gunpowder, clothes, or brandy are offered in exchange; but in cases of large demand, strangers must apply for the sanction of the governor.

Fresh Water.—A watering-place is situated on the beach a little westward of the fort; it consists of pits 3 or 4 feet deep, but their produce is so slow that not more than 30 barrels can be filled in a day, and it then requires to be filtered for drinking. It is, however, said to be wholesome, and to keep well, which appears rather doubtful. There is another watering-place on Passaro island.

Firewood.—Bissao is a bad place for laying in a stock of fuel, for though most part of the country is covered wlth forest, yet the natives are lazy and bring it with reluctance, delivering it at very high prices, and neither the climate nor the hostile disposition of the inhabitants will allow the crews of vessels to cut wood for themselves.

Tides.—It is high water, full and change, at Bissao, at 11 h.; springs rise 8 feet. At the anchorage the eastern stream ends at 12 h. 30 m. At springs the tidal stream runs about 2½ or 3 knots an hour. Higher up the river the flood is said to rise 14 feet.

To leave Jeba river.—The vessel which has been brought up in the preceding pages to Bissao, by Jeba channel, will now be conducted to sea again by the southern or Orango channel; the links which connect those two great inlets being Arcas and Bulama channels, and Kanabak reach.

Arcas channel.—The channel branches off from Jeba channel about 10 miles below Bissao, and is formed by Gancho banks to the westward, and Arcas flat to the eastward. Its narrowest part is 1¼ miles wide, between a depth of 3½ fathoms on either side. There are 14 and even 16 fathoms in some parts of it, while in others only 5 fathoms will be found at low water; this uneveness in the bottom produces overfalls with the tides, which sometimes appear alarming. Along the edge of Arcas flat, parts of which dry at low water, the soundings are very irregular, but it may always be cautiously approached with two quick leadsmen in the chains.

The soundings on the western side of the channel are rather more regular, and the slope of the bank inside of the 5-fathom line more gradual.

Pedralva rocks.—These rocks are situated on the western side of Arcas channel, about a mile south of Gancho banks; the principal rock lies 7½ miles N. by W. ½ W. from Bulama point; it shows a little after half ebb, and should be seen if possible by all strangers attempting to proceed through this narrow passage. To ensure its being easily seen, a wooden beacon, carrying two diamond-shaped vanes, was erected on its highest part in 1847, but it is not to be depended upon. The chief difficulty in navigating Arcas channel may be said to arise from its being so completely sheltered, that the sea seldom breaks upon its rocks or banks.

Directions.—In leaving Bissao road, in order to proceed to Orango channel or port Beaver, after rounding Passaro island, steer S.W., allowing for wind and tide, so as to bring that island astern, and apparently midway between Middleton point and Rey island, and therefore to bear N.E. If that mark be preserved, the vessel will pass half a mile northwest of Arcas flats, and will advance in a direct line towards Pedralva rocks. When the principal tree of the grove of St. Martin bears N. ¼ E. the vessel will be within 2½ miles of the beacon, and may then steer about S. ¼ E. for Bulama point. Having reached within a couple of miles of that point, edge a little to the westward, and pass it at the distance of a mile, in order to avoid the shoal ground extending from it; and here, as well as in all parts of this channel, remember that the flood sets to the N.E. and the ebb to the S.W., and therefore obliquely athwart the banks. The anchorage is good in most parts of the channel, though there are some deep holes and shallow spots, which last are probably indicative of foul ground in the vicinity ; these shoals generally produce strong ripples. When any of the fierce tornadoes which are so common on this coast are seen approaching, vessels ought to anchor immediately ; and if they are bound to Bissao, it may be useful to know that, if detained by wind or tide, their boats can always communicate with that town by the pass to the eastward of Arcas island.

Tides.—It is high water, full and change, at 10h. 10m. throughout the Arcas channel ; spring tides rising from 11 to 14 feet, and neaps about 9 feet.

Bulama point, the western extreme of Bulama island, has two conspicuous trees on it, and extending from it there are a few reefs which are steep-to ; the point, however, may be safely approached to within a mile.

Dalrymple bay.—At 4 miles south-east of Bulama point, off Hacket point, some extensive reefs extend 3 miles to the southward ; and between those two points, in a bight named Dalrymple bay, fair anchorage may be found in from 8 to 13 fathoms, sand and mud, with Bulama point bearing about N.N.W. The anchor must be ready to let go on shoaling to less than 20 fathoms, for inside of 8 fathoms the bank is steep. If this anchorage can be taken without risk, it may be a convenient berth in which to wait for the tide, as the holding ground is good and there is but little tidal stream ; water may be procured on the adjacent beach.

Bulama island has a population numbering 4,000, and it produces about 60,000 bushels of ground nuts annually. The settlement of Bulama is situated in Dalrymple bay.

Bulama channel.—From midway between Bulama point and the north-east extremity of Gallinha island, the course through Bulama channel is S.S.E. ¾ E. for a distance of 7 or 8 miles, or until within 4 or 5 miles of the low shores of Manteri island. This course equally avoids Hacket reefs on the eastern side, and on the other the eastern prong of the large shoal which seems to connect the islands of Gallinha and Kanabak ; all these shoals are too steep to admit of much benefit from using the hand lead, for a large vessel ought not to pass within the depth of 16 or 17 fathoms.

Bolola channel.—The Bolola and Bulama channels join south of Hacket reefs ; the former is the estuary of Bolola river and port Beaver. Bolola channel is narrowed by a bank extending from the south shore of Bulama island (Beggars bank), several places on which uncover at low water,

Port Beaver is so named from the settlement that was formed by captain Beaver, in 1792, on the eastern side of the fertile island of Bulama, but which was abandoned in the following year. In 1845, a Gambia merchant, engaged in the timber trade, established a small factory here. The harbour is easy to approach, the anchoring ground excellent, and the shelter perfect, as well as the facilities for landing. Water may be procured with some little trouble on the island, and more easily on the opposite shores of Biafares island, near the south-west extreme of which there are three springs. Some refreshments may possibly be procured, but no dependence can be placed on anything that is to result from the industry or humanity of the inhabitants of Bijouga islands.

Mao bank and a shoal of 6 feet, situated one mile eastward of it, both of which are situated at the entrance to port Beaver, may be passed to the southward, by keeping the south points of Biafares island in line, bearing E. ¾ N.

Bolola river, known to the Portuguese as Rio Grande, is reported to be navigable for a distance of 450 miles, the distance between the head of this river and that of the Gambia being accomplished on foot in a few days.

The main channel of the river lies southward of Bissagua island and all danger will be avoided by keeping in mid-channel and well clear of the points.

A depth of not less than 9 fathoms is maintained for about 16 miles above Bissagua island, when it decreases to about 20 feet, mud, which is found off the French factories situated on the left bank of the river.

Kanabak reach.*—At the confluence of Bolola and Bulama channels, Kanabak reach may be said also to begin, and the mid-channel course through it, as far as Barel point, is S.W. ½ S. for about 15 miles. This point, the south-eastern extreme of Kanabak island, is higher than the rest of the island, and is also conspicuous from the red rocks of which it is formed.

In most parts of Kanabak reach, the soundings will indicate a too near approach to the shoals on either side.

Kanabak island is moderately high, with an excellent soil of decomposed lava; and the cattle upon it, though rather smaller in size, are generally in finer condition than on the other islands of the Bijouga group. The eastern coast of the island may be safely approached by the lead, and everywhere offers a safe anchorage in from 10 to 8 fathoms, with good-holding ground, and within a couple of miles of the shore.

Damiong bay.—Water may be plentifully obtained at Damiong bay, at the north-east side of Kanabak island, but it requires filtering or boiling before it is used, for the long pool from which it is baled is overhung by trees, and is therefore always filled with fallen leaves. Their decomposition gives it a disagreeable smell and taste, but it was freely drunk in the *Ætna*, without producing any ill effects. This pool lies parallel to the beach, through which it oozes, but it is kept at an uniform level by the abundant supply of some neighbouring springs. Wells were also dug at a little distance from the shore, and they supplied pure and clear water. Wood may be obtained on all these islands, but at Damiong bay it may be cut and embarked with great facility.

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* *See* Admiralty chart:—Bijouga islands, sheet 3, No. 1,727.

Port Manel.—On rounding Barel point from the northward, a small cove will be perceived between it and the little island of Pomp, affording good anchorage, though at low water rather shallow. It is named port Manel, and is apparently the rendezvous of all the canoes belonging to that side of Kanabak island.

Orango channel.—This channel may be said to extend from Kanabak island to South breaker, and therefore to be upwards of 40 miles in length. Its least breadth (between Bronco reef and Cavalho spit at its northern entrance) is 5 miles ; but the distance between Pullam shoals and the ridges connected with the South breaker being 13 miles, it offers a broad estuary through which the stranger may work with perfect security, provided he pays attention to the tides, has the leads in hand when nearing either side of it, and adopts the useful precaution of keeping a look-out from the masthead for ripples or discoloured water.

From abreast of Barel point a S.W. ¾ W. course, due attention being paid to the tide, will lead out to sea through Orango channel.

Jamber group.—The islands of Jamber, Cavalho, and Mel are situated on the eastern side of the channel ; they are of nearly equal height, and the latter shows some extent of a white sandy cliff. The northern extreme of this group is less dangerous to approach than the shoals on the western side of the channel ; for Cavalho spit, lying north of Cavalho island, dries at low water, and almost always breaks, and the two small rocks near it are less than half a mile from its northern edge.

Jamber pass.—Between Mel and Jamber islands there is a narrow, deep channel, named Jamber pass, but it is not likely to be adopted by any stranger.

If circumstances should render the attempt necessary, the best time would be after the last quarter ebb, as many of the dangers in it would then be visible ; but even then it would be prudent to send a couple of boats ahead, to mark the projecting points of the reefs on either side, which may at that time be readily perceived by the ripples caused by the tide. H.M.S. *Ætna* passed through this channel, having just before completed its survey ; the *Raven* also beat through the passage to the eastward of Jamber island with ease ; but there are few occasions which would justify any large vessel in venturing through either of them. As 45 years have elapsed since these channels were surveyed, alterations have no doubt taken place; this fact should be borne in mind by strangers using the Admiralty charts.

Pullam island, so named from the lofty pullam trees growing on it, is the southernmost of the Jamber group, and the best landmark for the southern entrance of Orango channel. It is very small, but the reefs and foul ground by which it is surrounded extend for 6 miles to the south-westward, within the depth of 3 fathoms, and 4½ miles to the north-westward; these shoals, known as Pullam shoals and Bicho bank, form the eastern side of the south entrance of Orango channel. The whole space occupied by Jamber group is full of dangers, and should be avoided, or very cautiously approached. In some places the depths decrease in a single cast of the lead from 24 to 5 fathoms, or even less.

Bronco reef.—Along the western side of Orango channel there are several dangers. Bronco reef, on part of which there are but 6 feet at low water, with 8 and 16 fathoms within 2 cables, lies 5 miles E. ½ N. from cape Cameleon, and is nearly a mile in length. A quick leadsman will give sufficient warning when approaching this reef, but in clear weather Barel point, kept half a point open to the eastward of Sueste point, the south extreme of Kanabak island, bearing N.E. by E. ¼ E. will lead east of it in deep water.

Pipon patch lies west of the above line of bearing, and, though carrying but 12 feet, may be safely approached by the lead; its eastern extreme is situated 2½ miles south-west of Bronco reef.

Cameleon cape, the south-east extremity of Orango island, is of a yellowish colour and moderate height, it is readily recognised when seen from the southward.

Cameleon reefs project in a S.S.E. direction nearly 2 miles from Cameleon cape; but being far within the fairway track through the channel, no vessel is likely to approach them nearer than 10 or 12 fathoms, in which depth she should tack.

Orango reef, on which the sea always breaks very heavily, extends to the south-west for 10 miles from cape Cameleon. The ground shoals somewhat suddenly up to its eastern edge, the tides set rather sharply round it, and in some places across it, but the appearance of the broken water on it is quite enough to keep all vessels at a distance.

Ætna patches.—At a distance of 18 miles W.S.W. from cape Cameleon and 10 miles W. ½ S. from the tail of Orango reef, there are several long ledges of rocks, and at 3 miles farther to the westward some sandbanks, which dry at low water, and are named the Ætna patches.

South breaker.—To the southward of these shoals there are other banks and dangers, amongst which no vessel should venture; and at

10 miles south of Ætna patches there is a shoal on which the sea at all times breaks heavily. It is believed to be at the southern angle of the great triangular bank on which the Bijouga islands stand, and when made by vessels approaching from the southward, serves for a guide to the Orango channel or for a point of departure to those that have come through it from the northward. Its southernmost head, of 4 fathoms, is situated in lat. 10° 39′ N. and long. 16° 9′ W.; it is 22 miles southward of the nearest land (Orango island); 28 miles W. ¾ S. fom Pullam island; and the course from a position 4 miles south-east of South breaker to the south edge of Orango reef is N.E. ½ E. for a distance of 20 miles. Though no dangers were discovered to the southward of South breaker, yet there are some suspicious soundings; and as detached rocks and isolated shoals are numerous in this vicinity, the mariner is advised not to round it in a higher latitude than 10° 35′ N.

Tides.—It is high water, full and change, in Orango channel at about 10 h.; springs rise 11 feet; the ebb stream seldom exceeding 2½ knots an hour in velocity, except after violent freshes in the rivers, and the flood seldom exceeding 1½ knots, the general direction of the flood stream being to the N.E., and the ebb to the S.W.; constant watching, and verifying the position of the vessel on the Admiralty chart, are imperative, as in some parts the tidal streams set across the channel and over the shoals.

Off the mouth of Orango channel the flood stream sets N.E., and the ebb S.W., for a duration of 6 hours each way, with a strength of from half a knot to 1½ knots per hour.

Alcatraz island lies S.E. ¾ S. distant 26 miles from Pullam island; it is a volcanic rock 40 feet in height, traversed by deep fissures, and is the abode of innumerable boobies, whose eggs prove to be a great refreshment to the surveying boats' crews. Wreck island, low and sandy, lies one mile south-west of Alcatraz island, with shoal water between them. Reefs and foul ground extend to the southward from Alcatraz island for 7 miles, and for a distance of 5 miles to the westward; the western portion known as Alcatraz reef partially uncovers. In 1858 H.M.S. *Spitfire* struck on a shoal with 6 feet on it, lying S.S.E distant 1½ miles from Alcatraz island.

Unsurveyed coast.*—The extent of coast between the Bolola and Componee rivers does not seem to have been visited by either the Portuguese explorers or by the French or English surveyors. It is so low as to be seldom visible to vessels proceeding through Orango channel to Bissao.

This unknown coast, extending from Tombali cape to Tristão islands, occupies a space of about 40 miles in length, and lies from 10 to 20 miles east of the Jamber and Alcatraz islands, and those reefs which have been already described.

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* *See* Admiralty chart:—Africa, West coast, Sheet vii., Cape Roxo to Isles de Los, No. 600.

Cassini river.—The entrance to this river, which is situated about midway between Kanabak reach and Componee river, was partially examined by the French in 1857 ; it is obstructed by a great number of islets and sandbanks. There is a factory on the southern bank of the river at 10 miles within the entrance.

Componee shoals.—These shoals form the western side of the bay which receives the waters of the Componee and Nuñez rivers; they terminate to the southward in Conflict reef.

Conflict reef.—This extensive reef is composed of numerous rocky and sandy dangers, some above and others below water. From the reef two long and dangerous prongs project, one to the southward and the other to the westward, and vessels should approach them very cautiously either at night or in thick weather. The south edge of the western prong, where it terminates in 5 fathoms, lies in lat. 10° 23′ N. with Alcatraz island bearing North distant 16 miles, and cape Verga S.E. by E. distant 48 miles ; the southern prong bears E.S.E. distant 12 miles from the western prong.

Rocky head.—This dangerous shoal lies 6 miles S.W. by S. from the extremity of South prong it carries only 15 feet water, from which Gonsalez island bears E. ½ N., distant 26 miles.

Caution.—As other isolated knolls may have escaped the vigilance of the sounding boats, no vessels without great precaution should borrow on Conflict reef within 14 fathoms, especially on the line of its apparent prolongation.

The same vigilance should be exercised in every part of the bight between Conflict reef and cape Verga, and when in the offing of that bight, a vessel working along the coast, will perhaps find it more prudent during an adverse tide, to anchor instead of persevering in making a number of boards, which can avail but little against the stream, but which will expose her to the chance of picking up some undiscovered pinnacle of rock.

Gonsalez island.*—At about 23 miles east from the south prong of Conflict reef, the small island or Gonsalez, that may be seen from the deck of a vessel from a distance about 6 miles, forms the south-eastern point of the entrance into river Nuñez. There are two other islands (Broat and Dapecará) to the northward of Gonsalez, and between them and the mainland there is a narrow channel, named by the natives Broat river.

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* *See* Admiralty plan ;—Nuñez and Componee rivers. No. 1,562 ; scale, $m = 1\cdot0$ inches.

Gonsalez flat.—These islands are fronted by a dangerous flat of rocky and gravelly ledges, 1½ miles in breadth, and extending 8 miles south-westward of Gonsalez island. One part of this flat, situated 4 miles S.W. ¼ S. of that island, dries 6 feet at low water, and shows its bare volcanic structure for three quarters of a mile in length ; several shoals in the vicinity of this reef break during a fresh breeze.

COMPONEE RIVER.—The entrance to this river is between Conflict reef and the extensive banks and shoals extending about 13 miles south-west of the coast between Componee and Nuñez rivers : the main channel trends N.N.E. and S.S.W., but owing to frequent changes in the depth, the navigation is difficult and dangerous.

From South prong of Conflict reef, the entrance to Componee river bears N.E. by E. ½ E. distant 21 miles ; a portion of the bank on the western side of the entrance always breaks.

Componee river may be ascended for a considerable distance, but owing to the difficulties attending the navigation of the entrance it is unfrequented.

Coast.—Between Componee and Nuñez rivers are situated the mouths of two unfrequented rivers, the eastern of which is known as Cassagoua river.

NUÑEZ RIVER, the entrance to which is situated 10 miles south of Componee river, has been traced to its source about 50 miles inland. On its banks are established numerous French factories, the principal of which is Victoria or St. Eugenie, situated on the northern bank at 13 miles from the entrance. The climate of this river is extremely unhealthy, especially during November and December, when thick fogs prevail.

Talabouncha point, the northern entrance point of Nuñez river, is elevated and thickly wooded, appearing to be detached from the adjoining land. A bank of muddy sand, uncovered in many places at low water, extends 2 miles south-west from Talabouncha point.

Broat and Dapecará islands, on the southern side of the entrance, are covered with tall trees, their shores being fringed with mangrove bushes. Several rocks, above water, lie off the north extreme of Broat island.

Making the land.—Vessels bound into Nuñez river would naturally endeavour to make the high land of cape Verga, but this cannot be safely done, unless the weather be sufficiently clear to render it visible from a distance of more than 10 miles ; for at 8 miles to the westward of the cape there is a long dangerous shoal, named Verga ridge, lying nearly parallel to the shore, and carrying in some parts only 9 feet water. Even in clear weather the cape should be very cautiously approached, as the soundings in the offing have not been closely examined.

Directions.—Whenever cape Verga can be distinctly made out by a vessel approaching from the south-west, a direct course may be steered towards the mouth of Nuñez river, but a vessel coming from the north-westward should take a departure from Alcatraz island, and endeavour to sight the breakers on the prongs of Conflict reef. Be sure also of having reached the latitude of 10° 20′ N., and by keeping on that parallel till the meridian of 15° W. is reached, the vessel will have passed between Conflict reef and Rocky head, and may then steer for Gonsalez island, which will generally be seen from the deck when distant about 6 miles. At every cast of the lead the navigator must be prepared for great irregularity in the soundings, and should, under manageable sail, keep the leads constantly going. If Gonsalez island can be approached on an East course, the water will suddenly deepen to 10 or 12 fathoms at 6 or 7 miles from that island, and will again quickly shoal to 7 fathoms, but by this time the land will be distinctly seen, when haul in towards the mouth of the river, steering about N.N.E.; strangers are not recommended to enter Nuñez river without a pilot.

To enter.—In a steam vessel of 14 feet draught, bring cape Verga to bear S.E., and Gonsalez island N.E. ½ E., which will place the vessel 1¾ miles south-westward of the south-west edge of the bank extending from Gonsalez island; then steer N.N.E. ¾ E. for 12 miles, or until the break between Gonsalez and Broat islands bears S.S.E.; then alter course to N.E. by E. ¼ E. until centre of Sand island appears in line with Talabouncha point, when the vessel will be about half a mile south-eastward of Sand island in 6 or 7 fathoms, and may anchor, unless intending to proceed further up.*

Sand island lies at the entrance of Nuñez river, between Talabouncha and Talabajli points. It is the head of the shoals that form the western side of the channel, and, from the shifting nature of the sands, has at different times assumed various dimensions. In 1834 it was described as having a large space upon it available for encamping the crew of a vessel, and producing live timber, palms, &c.

In 1848, it was a flat at half-tide, and in 1858, it was described as merely a low flat of sand nearly level with the water, having a few shrubs on its south-west side.†

Village point, 5 miles above Sand island, has three large trees upon it that may be seen for a distance of 14 miles.

Anchorage.—A good berth is in 7 fathoms, with Sand island in line with Talabouncha point bearing N.W. by W. distant half a mile.

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* Commander C. W. Buckley, H.M.S. *Merlin*, 1858.

† Commander T. Lysaght, H.M.S. *Grappler*, 1848, and Commander C. W. Buckley 1858.

To proceed up the river.—From a berth half a mile south-east of Sand island, a course N.E. ½ N. for 5 miles will lead up nearly in mid-channel to abreast Village point, whence to Ropass (Rappace) there is no danger. By keeping nearly in mid-channel, nothing less than 3 fathoms will be found, and the difference in the soundings from the chains will indicate which bank of the river is being closed ; the bottom is of sticky mud, and there are no rocks, snags, or other dangers.

The river winds through a mangrove covered country, with a long island on the eastern side, and passes many native villages, until arriving at Ropass factory, on the north bank of the river, which forms a reach just above it. There is a flat of rocky ground extending from the southern shore nearly across to Ropass, which is impassable, except at high water. Vessels should anchor in the centre of the stream about a quarter of a mile below Ropass, and if to remain should certainly moor. Higher up the river it is necessary to moor head and stern, laying a stream anchor out astern against the flood. The *Grappler* proceeded as far as Cassasez, 70 miles from the entrance and 5 miles from Debucko, where she lay in the mud in 2½ fathoms at low water, and had it been necessary might have reached as far as that latter place, grounding, however, at low water. Debucko is the residence of the principal chief of the river, and stands on a commanding eminence on the eastern shore ; beyond this, it is said, boats cannot proceed far. During February the tide in the upper part of the river was found to ebb 8 hours and flow 4 hours, the rise being about 8 feet. The bottom is generally stiff mud, the banks steep, but soft, and the few rocks in the river may be suspected from the appearance of the shore. Alligators abound. Stock is to be procured at times from the interior, but water is scarce and bad. The wet season commences in May and ends in September, during which time the stream of the river is very rapid, and towards the close of the season, as the water subsides, the Nuñez is very unhealthy. In January, February and March, harmattans prevail, and the nights and mornings are cold, with a thick haze.*

Anchorage may be obtained in Nuñez river off Victoria, 13 miles from Sand island, in 7 fathoms ; or off Ropass factory, 35 miles from Sand island, in 4½ fathoms, with centre of Ropass bearing N. by E.

Leaving Nuñez river.—The converse of the mode of entering will be found to conduct a steam vessel of 14 feet draught out in safety. A slight allowance must always be made for the set of the tidal streams, which do not quite follow the direction of the channel, the flood setting a little northward of N.E. and the ebb a little southward of S.W.

Tides.—It is high water, full and change, at Sand island at 10 h. ; springs rise 15 feet, neaps 11½ feet.

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* Commander T. Lysaght, H.M.S. *Grappler*, 1848.

Nature of bottom.—"Keep in the mud," which would be almost sufficient to guide a vessel in all the rivers in this vicinity, is at the mouth of Nuñez river of more than common value from the shifting nature of the spits and sand-banks, as they yield alike to the floods from within and the gales from without.

Cappatches river.—At about 5 miles E.S.E. from Gonsalez island the entrance to Cappatches river will be seen; but as there were but 2 fathoms at 4 miles in the offing, within which the sea broke heavily, and as the volume of water appeared to be small, it was not considered worth the labour or risk of further examination. It is, however, said to be a trading river, the traffic being carried on by canoes and local vessels, drawing not more than four feet.

Verga ridge.—The coast from Gonsalez island to cape Verga forms a wide bay, though with such shallow water in it that no vessel should venture in; at about 7½ miles W.N.W. from the cape, Verga ridge terminates in 2¾ fathoms, after extending without intermission for 16 miles in a S.S.W. direction from the mouth of Cappatches river; it has possibly some off-lying shoals, and it forms on either side two open bights, in which vessels should be careful not to get embayed.

Verga cape cannot be mistaken, for, unlike all the adjacent shores, it rises at once from its base into high land, and when seen from the southward, in connection with a conspicuous eastern range of hills, is one of the most remarkable landmarks on the whole coast. It terminates in a rocky point inaccessible to boats, but with no off-lying islands or mangroves. South-east of cape Verga the shore resumes its low and swampy character; for a distance of 17 miles as far as the western entrance of the river Ponga, it is fronted by a shallow bank, the 3-fathom edge of which for a considerable distance lies 7 miles seaward of the beach.

When cape Verga bears East distant 13 or 14 miles, two conical elevations lying about 1½ miles north of the cape will be seen; the eastern of these is isolated and shaped like a sugar loaf, the western is the commencement of a chain which terminates in the interior in an isolated hill with two summits close together.

PONGA RIVER.*—The Ponga is a river of some magnitude, and, like most of the rivers on this flat coast, it diverges near its mouth into several branches. The most considerable of these are known as the Sand bar and Mud bar, besides which there are three other channels, two lying north-west of Mud bar, and one south-east of Sand bar; canoes pass freely from one to the other, by keeping within a line of breakers, which fronts the shore at the distance of about a mile.

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* *See* Admiralty plan:—Ponga river, No. 1,675; scale, m=1·0 inches.

Mud bar lies S.E. ½ E., distant 17 miles from cape Verga, and is two-thirds of a mile wide. Pilots may sometimes be obtained, but if not, though there is a scarcity of marks, yet by attention to the constant breakers on either hand the channel can hardly be mistaken, and may, if necessary, be attempted at three-quarter flood by any vessel drawing less than 15 feet.

Directions.—Being in 4 or 5 fathoms, or at a distance of 7 or 8 miles in the offing, bring the entrance of the river to bear N.E. ¾ E., which course will lead midway between the two sandbanks that extend 3½ miles outside it, and if exactly preserved will cross the bar into a depth of 4 fathoms; but it must be recollected when leaving the river by Mud bar, that although the flood sets directly *in* through the channel, yet the ebb sets obliquely *out* to the southward, across the easternmost of the two banks at the entrance, both of which are steep. These directions, if the compass be good and the lead kept quickly going, will conduct any manageable vessel cross the Mud bar, provided the maxim *keep in the mud* is borne in mind.

In clear weather.—Jilli point, which forms the south entrance point, terminates rather abruptly, and has on it a single bush; when it bears a little eastward of N.E. by E., a clump of bushes will be seen beyond the point. These objects kept in line lead in the deepest water across the bar; then on the first cast of 3 fathoms, haul immediately into mid-channel or, perhaps, the following directions may prove more satisfactory:—Góroo point, on the north side of the entrance, terminates in a row of palm trees; when their southern extreme bears about N.E. ⅓ E, a second row of palm trees will be seen just opening to the eastward of them, and the two rows kept in this position will lead in the deepest water between the two outer banks. When they are passed, steer midway between the points of entrance. This bar is composed of soft mud, into which the lead sinks deeply, and through which a vessel with a commanding sea-breeze would no doubt easily drag more than a foot in depth.

Sand bar.—The Sand bar mouth of the river Ponga lies about 7 miles south-eastward of the Mud bar. Observation point, which forms the north side of the entrance within the bar, terminates rather abruptly; Mooroora point, the south entrance point, is more shelving. Both east and west of the bar, the great bank with which it is connected extends considerably farther from the shore, and the many shallow spots on it give the appearance of an almost continuous line of breakers, so that no one who approaches it when the tide is low, will feel any inclination to attempt to cross it much before the top of high water. Neap tides rise here 9 feet, and therefore, if there be a moderate breeze and no great swell, any vessel drawing less than 15 feet may venture in at three-quarter flood, if no pilot offers himself, by attending to the following directions.

Directions.—At three-quarter flood (remembering that the flood stream sets obliquely across the channel to the northward), and with leadsmen in both chains, bring Observation point to bear between N.E. ½ E. and N.E. ¾ E., and keep it on that bearing till the first cast of 16 feet (allowing for the rise of the tide) shows that the vessel has arrived on the outer edge of the bar; then alter course, so as to bring the north-west shoulder of mount Mayondi a little east of Mooroora point, and run on that line for about a mile, which will lead across the bar in 14 or 15 feet (at low water). On obtaining the first cast of 3 or 4 fathoms, steer again for Observation point, keeping a good look-out for knolls of sand, which sometimes form in the channel. Two miles on this latter course will have led past the shallow banks on the northern side, and the vessel will be safe in a broad and deep channel. Keep Observation point bearing half a point on the port bow; it is steep-to on its eastern face, and may be passed at a distance of half a cable, and a good anchorage may be then taken near the point at pleasure.

Anchorage off Ponga river.—H.M. vessels of war usually anchor off the Sand bar in 7 or 8 fathoms, but in thick weather it is difficult to distinguish the entrance from that of the Mud bar. The south entrance points of each, being formed by bluffs, are very similar. The leading feature is mount Mayondi, a truncated cone with gently sloping sides, 1,300 feet high, and the most conspicuous of a chain of inland hills.

Bangalong.—To proceed up the river to the town of Bangalong, 21 miles above Observation point, a pilot is required; but if none can be had, and circumstances require despatch, a vessel, by keeping the northern shore on board, may safely proceed as far as Ismir point, situated on the east side of the river 2¼ miles N.N.E. of Observation point, and then, with a skilful use of the lead, a couple of boats, and a flowing tide, no great difficulty will be found in reaching the town of Bangalong.

Dominghia, 5 miles above Ismir point, on the west side of the river, is the head-quarters of the French customs, off which place anchorage may be had in 9 fathoms.

Caution.—After all, however, that has been said of these two bars or entrances to the river Ponga, it is necessary to remind the mariner that it is some years since they were examined (1830), and that there is good reason to believe that every gale and every rainy season alters more or less the form and extent of all their banks and shoals. Therefore neither Ponga nor Nuñez rivers should, under any circumstances, be entered by a stranger without a pilot.

Supplies.—The resources this river affords are trifling; neither bullocks nor vegetables are to be obtained. Other stock is scarce, and only to be procured in exchange for rifles, ammunition, tobacco, handkerchiefs, &c.,

money being of no use. For water, which is not good, boats must proceed a long way up; but wood may be easily procured at Observation point, as the trees there grow nearly to the water's edge, and boats can lie conveniently alongside the sandy beach.

Tides.—It is high water, full and change, at the entrances of Ponga river at 7 h. 30 m.; springs rise 12 feet, neaps 9½ feet; the strength of the tidal streams is about 1½ to 2½ knots an hour, except during the period of floods (July–September) when it is much greater.

Current.—During the months of October and November the current off Ponga river has been observed to set N.E. and E.N.E. for several days in succession.

Dembia or Brameah river.*—From the sand bar of Ponga river the coast, formed by a low shore fringed by mangroves with a detached line of breakers, trends south-east for a distance of 20 miles to the mouth of the river Dembia. It is said that this river will admit small vessels, but as no channel across the bar was found to have more than 4 or 5 feet at low water, it was not further examined.

Kakulimah mount.—The Paps of Soumba lie East from the mouth of Dembia river, and on that bearing this mount will be easily recognized; the Paps rise from a range of high land to 1,700 feet above the sea; and mount Kakulimah, 11 miles farther to the south-east, attains the height of 2,900 feet, it is a conical peak with steep and regular sloping sides. This group of hills covers a large space and may be seen from a great distance.

Konebomby bank.—One side of a triangular mud bank, which dries at low water, extends from the south entrance point of Dembia river, about 5 miles to the south-westward, the edge of the bank then trends towards the shore of Konebomby island, the western angle lying N.W. ½ W. distant 6 miles from Alligator point, the south extreme of Konebomby island.

Sangareeah bay.—Konebomby island and bank form the north-west side of Sangareeah bay, into which the river Debreeka pours the waters of the mountainous region above mentioned. The south-east side of the bay, 20 miles in length, extends from the mouth of that river to Tumbo point, south-westward of which distant 2 miles are situated the Isles do Los. Extensive flats and shoals project into the bay from each side, leaving only a 2½-fathoms channel between them at low water; the shores of the bay are so intersected with creeks that they form a series of islands, some of which are forming while others are disappearing; great caution should be exercised when crossing the entrance to Sangareeah bay.

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* *See* plan on Admiralty chart, No. 594.

Debreeka river.—Should a moderate-sized vessel wish to enter this river, bring mount Kakulimah to bear East; and timing the run upon that course, so as to be as far in as the 4-fathoms line by half flood, proceed until abreast of Alligator point, the north entrance point, which should be passed at the distance of about 2 miles. When this point bears N. by W., alter course a little to the northward, so as to bring the extremity of the ridge, which lies westward of mount Kakulimah, in line with the termination of the sandy beach on the south-eastern shore. The water will now deepen a little, and passing Creek point, the south entrance point, by the lead, take up an anchorage at such a distance from the mouth of the river as may be convenient; or by sending a boat to mark the edge of the bank on the south side of the river, it may be entered without much danger. The water here is unfit for Europeans and very scanty, but wood will be found everywhere.

Soundings.—The bottom along the whole of this coast, from Dembia river to the Isles do Los, under a depth of 10 fathoms is of soft blue mud, into which the lead sinks deeply; and when a vessel approaching from seaward arrives in 5 fathoms, the water will be found at times so thick on the surface, as to lead one to imagine that the bottom is being stirred up. The muddy tinge, however, of the shoal water is of a much lighter cast.

Seasons.—The fine season on the coast comprised between cape Roxo and Isles do Los lasts from the middle of November until the beginning of May; the rainy season from the middle of May to the commencement of November.

Winds and weather.—In the fine season light East and N.N.E. winds are experienced during the morning when near the coast; the sea breeze seldom commences before noon, and often blows freshly.

Calms at this season are frequently experienced when southward and eastward of Bissagos islands.

Fogs during the morning, lasting until about noon, are of daily occurrence during the latter part of autumn on the coast of Ponga, as well as among the Bissagos islands.

Rain is almost continuous during the months of July and August.

Tornadoes are experienced during April and May, and from the middle of September until the end of October.

The harmattan is experienced during December, January, and February, blowing from S.E. to N.E.

CHAPTER VIII.

ISLES DO LOS TO SHOALS OF ST ANN.

VARIATION in 1880.

Sierra Leone - - - 19° 45′ W.

ISLES DO LOS.*—This group consists of three moderately high islands, besides several bare rocks and reefs, situated 2 miles south-westward of Tumbo point, the east limit of Sangareeah bay.

Tamara or Footabar island, the westernmost and largest of the group, makes like two islands, and being 465 feet high, may be seen from a distance of 20 miles in clear weather. The island is thickly wooded, 5 miles long, and about a mile in breadth, its curved form adds to the shelter it affords to the anchorage on the east side. Eastward of Topsail point, the south extreme of Footabar island, are situated two high conical rocks, the eastern of which is 4 cables from the shore.

There is a village near Barrette point, the north-east extreme of this island.

Arethusa reef, on which H.M.S. *Arethusa* struck in 1811, projects about 3 cables from the northern extremity of Footabar island.

Factory island, the easternmost of the group, is 4½ miles in length, in a north and south direction, and in some places not more than a quarter of a mile across, it is concave on its western side, and forms the eastern limit of the anchorage; on the eastern side of the island, at 2 miles from the north extreme, are situated several French and English factories, the depôts of the commerce of the neighbouring rivers.

Cooper rock, awash at low water, lies 6 cables east of the south extreme of Factory island; a shoal of 3 fathoms lies 2 cables east of Cooper rock.

Whites island and Kid island, both wooded and nearly joined by a ledge of rocks, are separated from the south-west extreme of Factory island by a narrow channel, only available for small vessels.

Rooma or Crawford island is about a mile long, in an east and west direction, and lies nearly in the middle of the space enclosed by Tamara and Factory islands. An extensive shoal, 2 miles long, extends to the north-east from this island, and apparently blocks the passage between it and Factory island. As Crawford island is uninhabited it is a good place on which to haul the seine, or for vessels-of-war to land men for exercise.

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* *See* Admiralty plan :—Isles do Los, No. 612; scale, $m = 1 \cdot 3$ inches.

A sunken rock lies about 1½ cables south-west of the south-west extreme of Crawford island, and a rock above water lies near the shore, north of the highest part of the island.

Coral island lies 1¼ miles S.S.E. from the south extreme of Footabar island; a reef of rocks lies S.E. from Coral island, distant a quarter of a mile.

North Channel, between the north-east extreme of Footabar island and the north-west extreme of Factory island, is about 1½ miles wide in a S.E. by E. and N.W. by W. direction; the depth midway is 7 fathoms, but the entrance points should not be approached nearer than 3 cables.

Directions.—Vessels intending to enter the anchorage between Crawford and Footabar islands from the northward, should as soon as the north peak of Factory island opens well clear of the north extreme of Footabar island, distant about 3 miles, and the passage between Tumbo point and Factory island appears open, endeavour to make good an E. by S. ¼ S. course, allowing for a tidal set of 1¾ knots an hour (whether flood or ebb), until the north-west and south-west extremities of Factory island are in line, bearing S. ¼ W. Then the eastern extremity of Coral island, in line with the western extremity of Crawford island, bearing S.W. ¼ S., becomes the leading mark, until south of Barrette point, when the marks should be kept a little open, or the vessel steered for the middle of the channel between Topsail point and Coral island, to avoid the shoals extending north-east from Crawford island.

South channel is situated between the south extreme of Footabar island and Coral island, that lies S.S.E. distant 1¼ miles from it; there are 8 fathoms in mid-channel, but the western shore should not be approached nearer than half a mile when Footabar island south extreme bears to the westward of W. by N.

To enter by South channel.—Steer in with the northernmost peak of Factory island in line with the north-western extreme of Crawford island, bearing N.E. by E. ½ E., until the south extreme of Footabar island bears W. by N., when a course may be shaped for the anchorage.

Tides.—It is high water, full and change, at Crawford island at 6h. 35m.; ordinary springs rise 13 feet, equinoctial springs, 17 feet.

If approaching from the westward it is advisable to enter by North channel with the ebb, and by South channel with the flood.

The flood stream sets to the N.E., and the ebb in a contrary direction.

Anchorage.—The anchorage between Footabar and Factory islands is in 5 fathoms, about one mile or more north of the west extreme of Crawford island, or midway towards Footabar island, but very safe and convenient anchorage may be had, north-east of the north extreme of Factory island, at 3 cables off shore, in 4 fathoms, with the eastern extreme of Factory island bearing South, and the north extreme of Footabar island bearing N.W. by W. ¼ W.

Water.—The best water on Footabar island is to be obtained at the landing-place on the east side, at one mile south of the north-east extreme of the island, but it cannot be embarked after three quarters ebb, and during the rainy season the swell at the anchorage renders watering with boats dangerous. Very good water may at all times be easily procured, from a pool 6 or 7 feet deep, at the beach under the north peak of Factory island, and also near Shark's nose point on the east side of that island.

Tumbo channel.—Between the Isles do Los and the sharp low point of Tumbo there is a safe channel, available for vessels drawing 12 feet, and much time may be saved by using it, provided the tide be favourable. There are no dangers in it, and the bottom being of mud, affords good anchorage if necessary. Some shoal water off the north-east extreme of Factory island will be avoided by keeping Shark's nose, the south-east extreme of Factory island, open east of Mat point, the next point to the northward of it. Still, without some good reason for hugging the shore, it will always be advisable to pass outside the Isles do Los.

Remarks.—When approaching the coast in the vicinity of Isles do Los, it may be remarked that though a bank of 3 fathoms in some places extends to a considerable distance from the shore, yet the soundings are so regular as to give ample warning. A tumbling sea at times may prevail during a strong breeze, but as no gales (except tornadoes, which are of short duration and blow off shore), are experienced upon this coast, the mariner need never be alarmed, for there is generally good anchorage everywhere, and no long swell or current to force a vessel into danger.

Tumbo point[*] is the south-west extremity of an island bearing the same name, and separated at high-water from the mainland, by a narrow and rocky channel, through which nothing but canoes can pass. Southward of Tumbo point, the land recedes to the north-eastward about 7 miles, forming an extensive but shallow bay, at the head of which is an inconsiderable stream named Tannaney river, accessible to canoes only.

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[*] *See* Admiralty chart:—Africa, West coast, Sheet viii., Isles do Los to Sherbro island, No. 601; and plan of the entrances of Tannaney, Mahneah, and Morebiah rivers, No. 613; scale, $m = 0{\cdot}7$ inches.

A ledge of rocks extends half a mile south-west from Tumbo point, terminating in two rocks which uncover at half tide.

Mahneah river, situated about 12 miles E.S.E. from Tumbo point, is at low water scarcely accessible to the smallest coasting vessels. The entrance is about 6 miles south-eastward from that of Tannaney river, but the water between is very shallow ; a mud bank, which extends south-westward from the west point of the entrance of Mahneah river, is uncovered at low water, for a distance of about 2 miles from that point. A similar mud bank fronts the east side of the entrance also, leaving the channel between, about a mile wide, but carrying only from 3 to 8 feet at low water.

Directions.—To enter Mahneah river it is only necessary to bring the western point of the entrance (while at the distance of 5 miles from it) to bear N.E. by E. ½ E., and then steer towards it, until close to the northern mud bank at the entrance, when a vessel may proceed along the edge of that bank, in a convenient depth, according to circumstances. The quantity of water discharged from this river must be very great, as the ebb tide runs out with great rapidity.

Morebiah river lies about 18 miles S.E. by E. ½ E. from Isles do Los, and about 7 miles north from Matacong island ; and though its breadth within the entrance points nowhere exceeds half a mile, yet it is far more accessible than the Mahneah. The entrance is narrow, and the channel across the bar forms an elbow, which, to render perfectly safe of approach, would require to be marked by two buoys, as the coast is destitute of good natural objects to serve as leading marks ; the following directions however may be of use.

Directions.—In approaching the coast in the vicinity of Morebiah river, when its opening bears E. by N. ½ N., distant about 9 miles, and Matacong island bears S.E. by E. ¼ E., there will be 6 fathoms water on black mud ; from this position, keeping on an E. by N. ½ N. course, the depth will decrease gradually, over a bottom of the same kind, to 3½ fathoms at the entrance of the channel. With the rounding of the land between the rivers Mahneah and Morebiah bearing N.N.E., the south-east point of the entrance E. ¾ N., and the centre of Matacong island S.S.E. ¾ E. the depth is 3½ fathoms. From this position steer N.E. by E. ¼ E., until the east entrance point of the river bears E. ¼ S., and then stand in towards this point, remembering that both flood and ebb streams set partially over the extensive shoals that form the south side of the channel ; some of these, however, being dry at low water, and others nearly so at high water, their steep boundary is perfectly discernible. In the elbow of the channel across the bar, the least depth is 1¼ fathoms at low water springs, but this depth continues only a short distance; and from the time of altering course to the eastward, or steering directly in, there will seldom be so little as 2 fathoms. Beyond the eastern entrance point, the depth varies from 4 to 6 or 7 fathoms, and for the distance of 7 miles up the river, it appeared to be clear of all danger.

Graniterock.—At about 4 miles within the east entrance point of the river a remarkable round mass of granite rock rises abruptly, to a height of about 40 feet. It is about 400 yards in circumference, and situated near the shore on the eastern side; the natives assert that several similar masses are scattered about the plain, as far as the Sangaree mountains, which, they report, are also composed of the same species of rock.

Tides.—It is high water, full and change, in Morebiah river at 7 h. 40 m.; springs rise 11 feet.

Aspect of Coast.—The contrast which the coast in this vicinity presents to the eye in different states of the atmosphere is very great. In clear weather the view of the fertile shelving hills in the Isles do Los—the stupendous features of the distant inland mountains—the plains covered with trees, and the beautiful little island of Matacong, is highly interesting; while in hazy weather, nothing is visible but a low coast, fringed by mangroves, and enveloped in mist, with an indistinct opening of a river here and there, or perhaps a column of smoke rising from a native village.

Matacong island[*] is situated 22 miles south-east from the Isles do Los; its beauty consists in the luxuriance of the trees, the verdure of those spots which have been cleared, and its gentle slopes, which render it a striking contrast to the low swampy tract of mainland opposite. It is about a mile long, and three quarters of a mile broad, and is the central depôt for the trade in ground nuts carried on with the neighbouring coast, a factory being built on the north side. The island appears to be composed of lava, yet on its summit there are two large pieces of granite, which the natives assert have been artificially placed there.

At the factory there is a crane to assist in loading and unloading boats and small vessels.

Matacong island is surrounded by mud banks and rocks in all directions, so that none but small vessels can lie at anchor within 2 miles of it. The channel which divides it from the mainland is nearly three quarters of a mile broad, but dries at low water.

Soundings.—In the extensive bay between Matacong island and the Isles do Los, there are no detached dangers. The coast is safe to approach, the soundings being regular, and anchorage good; it is in all parts accessible to large vessels to the distance of 7 miles from the shore, which generally may be considered sufficiently near to distinguish the land, and often to recognize the mouths of the rivers. In thick weather the water should not be shoaled under 7 fathoms.

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[*] In 1856 this island was the property of a merchant of Sierra Leone, and used as an establishment for rearing cattle.

Coast.*—Sallahtook point bears S. ½ E. distant 14 miles from Matacong island, the general features of the coast between are similar to those already described, but the inland mountains are too distant to be distinctly seen; here and there a cotton tree with smooth trunk and spreading foliage, rises above the surrounding thickets, and serves to identify the locality to those who are acquainted with it; but a stranger can only distinguish the mouths of the rivers which he intends to enter, by the latitude, or by running along the coast from some known point.

Foreecarreah river.*—From Matacong island the coast trends to the eastward for 3 miles, where it turns abruptly to the northward, and forms the west entrance point of the river Foreecarreah; the space between being fronted with sand and mud banks, which extend more than 3 miles to the southward. The entrance of this river is about 2 miles wide, and the least depth in it is 6 feet.

To enter.—To sail in, it will be necessary to pass close to the banks which extend from the west entrance point, but at the same time to be cautious in approaching them, as they are steep-to, and dry at low water. The outer sand will be apparent, even in fine weather, except perhaps at high water, and when seen may be safely skirted in 2 fathoms near low water, or in 4 fathoms at high water. In order not to get entangled in the bight between the forks of this sand, do not bring the highest part of Matacong island to bear westward of N. by W. ½ W. until the west entrance point of the river bears N.E. Then steer towards West point, and, as a general rule keep near the western side of the river, though edging off occasionally to avoid the banks. The navigable part of the river is very short, as a ridge of rocks nearly crosses it at a mile from its mouth. The ebb stream here is extremely rapid, and the overfalls in the vicinity of the rocks are dangerous to those who do not possess local knowledge.

Tannah island divides the entrance of Mellacoree river from that of the Foreecarreah; the west and south-west sides of this island are fronted by extensive sand and mud flats, which dry in several places at low water.

MELLACOREE RIVER.—This river falls into the sea immediately northward of the high land of Sallahtook point, distant 34 miles

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* *See* Admiralty plan:—Entrances of Foreecarreah and Mellacoree rivers, No. 614; scale *m* 0·7 inches.

N. by E. ½ E. from cape Sierra Leone. It has better natural objects for leading marks than either of those rivers already described; but though the facilities for its navigation are greater, yet a pilot is indispensably requisite.

Three important streams fall into Mellacoree river; on the northern side Tannah river, immediately east of Tannah island, affords communication with the Foreecarreah, and on the southern side Sambo river, entered 3 miles east of Bentee point, communicates with Scarcies river; Mauricania river, the entrance to which is on the south side, 2 miles east of that of the Sambo, has not yet been explored.

To approach.—At 10 miles off shore when west of the entrance there are 6 fathoms water, and with the river's mouth bearing E. by N. it will be fairly open. Steer towards the south channel in that direction until the soundings have decreased gradually to about 3 fathoms at low water, and the following bearings are obtained:—Bellansang point, on which there is a conspicuous clump of trees, E. ¼ S.; west extreme of Yellaboi island, S. ¾ E.; Sallahtook point, distinguishable by the trees upon it being higher than elsewhere, S.E. ½ S.; Bentee point, known by a remarkable large tree, E. by N. nearly; the north entrance, or Tannah point, E. by N. ¾ N., and the rounding of the land to the northward of the river N.E. ½ N.; this position is near the spot indicated by the outer anchor in the Admiralty plan, and in the fairway.

Middle ground, a bank of hard sand that forms the north side of the south channel, is steep-to, but the edge of the bank is generally marked by strong ripplings; the pilots recommend skirting it, instead of borrowing on the other shore.

The eastern extremity of Middle ground dries at low water, also some places on its northern side. Middle ground divides North from South channel.

Pilots.—Good pilots for Mellacoree river may be obtained at Sierra Leone for either a steam or sailing vessel.

To enter.—A vessel of 15 feet draught may enter at three-quarter flood, when the least water found will be 19 or 20 feet, hard sand; bring Bentee point to bear E. by N., and keep it on that bearing until about a mile from Tannah point, when haul over towards the mouth of Tannah river, and there anchor.

Beacons.*—The outer edge of the shoals on either side of the river between Tannah river and Bentee point is marked by a red beacon surmounted by a conical ball; at low water these beacons are dry, and at high water the balls are awash.

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* Annonce Hydrographique, No. 29, of 1874.

Rock.—A rock, with 7¾ feet on it, lies N.W. by N. from the south beacon, distant 1⅓ cables.

To proceed above Tannah river.—The deep-water channel between the banks extending from the north and south shores is a third of a mile in breadth, with a depth of 7 to 9 fathoms. By keeping the East point of Tannah river bearing N.W. by W. ¼ W., this channel may be used with safety; the northern beacon, in line with the northern cotton wood tree on Bentee point, leads north of the Southern bank, and by keeping the same beacon in line with the trading post at Bentee, a vessel may proceed until within 2 cables of the beacon, which should be rounded at a distance of half a cable; after passing this, the south bank of the river may be followed as it is safe of approach, and, there being no further danger, except a few rocks close to Bentee point, a vessel may ascend the river to the factories established abreast of Devil island, 2½ miles east of Bentee point, the general depth in the channel varying from 5 to 9 fathoms. Vessels trade as far up as Malaguia, but those of 10 feet draught are advised to anchor off Toumany, 6½ miles above Bentee point.

Bentee point is well marked by a tall tree situated near the extremity; since 1866 it has been occupied by the French as a fortified post.

North channel.—Besides the channel on the south side of Middle ground, for which directions have been given, there is also an entrance to the northward, only available for small vessels; to take which, when 5 of 6 miles off shore, bring Tannah point to bear E. ¾ S., and by carefully using the lead, a handy vessel may proceed in with safety; for although at its termination the channel takes a slight turn round the north-east edge of Middle ground, yet this is generally so well indicated that one can scarcely be deceived.

Tannah river.—This river, which falls into the Mellacoree on the northern side, is also navigable, though much smaller, and the tides are not so strong as in the main stream; at 5 miles from the entrance, on the west side, is situated a creek, that admits of boat communication with Foreecarreah river.

Sallahtook point is higher than any part of the adjacent coast, it is covered with mangrove bushes, which give it the appearance of terminating abruptly; a reef of rocks, both above and below water, extend 1¼ miles north-west and north of Sallahtook point.

Caution.—On account of the soft nature of the bottom, vessels may ground in several places in the vicinity of Mellacoree river without being injured; but the foul ground which surrounds the long reef off Sallahtook point must be carefully avoided.

Tides.—It is high water, full and change, in Mellacoree river at 7 h. 40 m.; springs rise 11 feet.

Coast.*—From Sallahtook point the coast trends S.S.E. for a distance of 7 miles to a small river, on the western point of which is situated Sangahtook factory; at about 1½ miles westward of this point lies Yellaboi island, surrounded by mud banks that are dry at low water, and which then connect it with the mainland. Another small river named Inglis Pahboyeah is situated 1½ miles south of Sangahtook factory.

Yellaboi island is low, swampy, nearly 2 miles in length, and covered with trees, which towards its western extremity give it the appearance of an abrupt cliff, easy to be recognized.

Corteemo island lies 4 miles S.S.E. from Yellaboi island; it is a much larger island, with extensive mud banks extending to the north-westward, but with a deep channel between it and the mainland; it lies in the entrance of the Scarcies rivers. These streams are known by the names of Great and Little Scarcies; the former is navigable for large vessels, but the latter is adapted to very small vessels only, and requires careful pilotage.

Great Scarcies river.—The direct channel from seaward to Great Scarcies river leads across 7 miles of shoal water, and shifting banks; and, therefore, vessels would do well to adopt the entrance through Yellaboi sound; for although the banks in this sound are steep, yet it is broad and deep, and a large vessel, by taking a proper time of the tide, might cross the bank which obstructs the eastern part of the sound, and moor off the south extreme of Yellaboi island.

Yellaboi anchorage.—To sail into this anchorage, bring the west extreme of Yellaboi island to bear E.N.E., and steer towards it until the depth decreases suddenly to 5 fathoms. Now alter course, and keeping in 4 or 5 fathoms, steer for Inglis Pahboyeah river, well open of the south-east extreme of Yellaboi island, bearing E. ½ N., until the west extreme of that island bears N. by E. ¾ E.; then haul in towards the island, and skirting along the steep mud bank which borders its south side, steer for its south-east extremity, close to which a vessel may anchor in 4½ fathoms. By following these directions, the least depth found will be 2½ fathoms at low water; and this only occurs after hauling in for the island, and while running along the edge of the mud bank on its southern side.

Kakonkah island.—A timber vessel lying at Yellaboi anchorage could easily have the cargo rafted down from Scarcies rivers, except during the rainy season, when it is affirmed that the strong winds occasion so heavy a sea, as to make it unsafe to lie there with raft ports open. With little difficulty, however, at that season, a vessel might proceed to Kakonkah island, though the channel is narrow and crooked, and would perhaps require buoying. It would be scarcely possible to give intelligible marks for this winding channel, but it is so apparent in the Admiralty plan, that by sending a boat ahead and never shoaling the water to less than 3 fathoms, except when crossing the short flats which lie north and south of Yellahgoombah island, a vessel can scarcely make any mistake; the bottom is so soft, and the water so smooth, that no damage will arise from touching.

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* *See* Admiralty plan.—Entrance of Scarcies rivers, No. 615; scale, $m=0{\cdot}7$ inches.

In June, 1876, the bar south of Yellaboi island (on which was a depth of about 9 feet at low water) was found to lie to the westward of its assigned position, and there was a depth of 3½ fathoms on the flat extending from the south coast of that island. Between Sangahtook factory and Inglis Pahboyeah river, a mud bank, dry at low water, extends a considerable distance to the southward. The southern edge of this bank may be avoided by keeping Yellahgoombah island a third shut in by the north-east extreme of Corteemo island, bearing S.E. ¾ E. After passing this bank keep on the northern shore of the channel for about a mile, and then steer across to the north-east extreme of Corteemo island, after skirting which steer for the south extremity of Yellahgoombah island, which must be rounded as close as possible. From this position a vessel may steer direct for Kakonkah factory. After passing Kakonkah island, keep very close to the northern shore of the channel, where there is a narrow 10-feet channel.*

Tides.—It is high water, full and change, in Great Scarcies river at 7 h. 10 m.; springs rise 10 feet.

Coast.—From the point forming the south side of the entrance to the Scarcies rivers the coast trends south-west to Ballo point, and thence to the mouth of Sierra Leone river, from which it is distant 18 miles, it takes a more southerly direction. This coast is fronted by an extensive shoal, the depth of one fathom being found in some places at a distance of 4 miles from the land; and with Ballo point bearing East, a vessel will not be sure of carrying 7 fathoms at a less distance off shore than 14 miles.

Cooper rock, which generally breaks, is situated on the southern part of this bank. From it cape Sierra Leone bears S.S.W. ¾ W., distant 7 miles; this rock lies 3¼ miles from the nearest shore.

SIERRA LEONE, in respect of the number of its European residents, is the most considerable of the British possessions on the west coast of Africa. The colony consists of the peninsula that terminates in cape Sierra Leone, with a large tract of country named Sherbro. The population of Sierra Leone in 1871 numbered 37,039, and in the year 1877 the value of the imports was 368,442*l.*, and that of the exports 388,530*l.*

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* Lieutenant A. W. Warry, H.M.S. *Mallard*, 1876.

Entrance.*—The entrance to Sierra Leone river, immediately northward of cape Sierra Leone, is obstructed by an extensive bank of sand interspersed with large stones, named the Middle ground, which in many parts is dry at low water. There is a passage on either side of it, but that to the northward is only available for small vessels, and even by them is rarely attempted, as they must cross a 2-fathoms bar, which appears to connect the eastern extremity of Middle ground with the main land. The principal channel lies between cape Sierra Leone and that bank, having a clear passage of more than a mile in breadth everywhere, with a depth varying from 5 to 10 and 12 fathoms.

Carpenter rock lies W.N.W. distant 7 cables from the north-west extremity of cape Sierra Leone : it uncovers at half tide, and may easily be distinguished by its breakers, it should be borne in mind that both flood and ebb streams set directly on this rock.

Clearing marks.—Any point from Farran point to Lookout point, kept open to the northward of cape Sierra Leone, leads north of Carpenter rock : this mark is also useful in observing the direction of the tidal stream. During the ebb the stream sets to the south-eastward, and to the northward during the flood.

Bromham rock lies between Carpenter rock and the shore, and appears to be the termination of a series of shoals, that extend in a W. by S. direction from the extreme west point of the cape. The rock is about 30 yards in circumference, nearly flat, and has only 16 feet on it at low-water springs. There are 4 and 5 fathoms between it and the shore, and 5 and 6 fathoms close to and around it. From the rock Sierra Leone lighthouse bears N.E. by E. ½ E., distant 4 cables ; Carpenter rock N.W. by W. ½ W., distant 5½ cables ; and the extreme west point of the cape E. ⅜ N., distant 1¼ cables. The lighthouse bearing E. by N. ½ N. leads north of the rock ; and the north extreme of the sandy beach, where it first joins the rocks south of cape Sierra Leone, bearing E. ½ N. will lead southward of it.

The channel between Carpenter and Bromham rocks is clear, but is not recommended except in cases of emergency. Even in the dry season the tide rip in this channel is dangerous for boats.†

Coast.—Between cape Sierra Leone and Freetown the coast is indented by three bays, the western of which is known as Pirate bay, and the eastern Kroo bay, between these is situated English bay.

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* *See* Admiralty plan :—Sierra Leone river, No. 616 ; scale, *m* = 1·0 inches.

† Commander A. T. Powlett, H.M.S. *Siteful*, 1877.

Pirate bay.—The western entrance point of Pirate bay is surmounted by a peak, which rises higher than cape Sierra Leone, and on a hill about a mile south of the east entrance point (Lookout point) there is a lookout station.

The shore of Pirate bay is of reddish and dark rocks.

King Toms point, which forms the dividing point between English and Kroo bays, is the northern extremity of a flat, almost circular peninsula, which on some parts is thickly wooded ; there is a battery and some ruins at its north extreme, and a large mission establishment on its eastern side.

Freetown.—This important town was founded in 1792, it is built on rising ground sloping from the hill on which stand fort Thornton ; on on an elevated plateau 400 feet high, lying south of this hill, are situated the hospital and barracks.

The streets of Sierra Leone are wide but unpaved, the houses being mostly constructed in European style ; it is the residence of the principal civil and military authorities connected with the West Africa settlements.

LIGHTS.—On the northern extremity of cape Sierra Leone is situated a white lighthouse, 47 feet high, from which, at an elevation of 69 feet, a *fixed red* light is exhibited, visible in clear weather from a distance of 7 miles. From the lighthouse, Carpenter rock bears W. ½ N. distant 9 cables, and the western edge of the Middle ground bears N.E. ½ N. distant 2 miles.

Harbour light.—A small *fixed green* light is shown from the government wharf, as a guide to the anchorage.

Approaching the land.—Vessels approaching from seaward will probably endeavour to strike soundings in lat. 8° 30′ N. When in a depth of 9 or 10 fathoms they will be 12 or 13 miles from the shore ; or if the weather be clear, they will have seen the high land named Lion mountains, situated south of the cape, which should be brought to bear E.S.E. ; when about 10 or 15 miles distant from the shore, cape Sierra Leone will be seen, making like a low point, with a ridge of cocoa-nut trees close to the water's edge, and shortly after the lighthouse on it will be distinguished.

Directions—Allowance for the tide must be made when nearing Carpenter rock. The cape may be passed at a distance of a quarter of a mile, with a commanding breeze, in 9 or 10 fathoms. From thence a S.E. by E. ½ E. course for 3½ miles will lead to the anchorage off Freetown ; it is recommended to keep somewhat near the shore, where the tides are less strong, thus avoiding the Middle ground and the numerous eddies round it, which are so strong as to effect the steerage. A vessel of 24 feet draught should not bring Sierra Leone lighthouse to bear southward of S. by E. until Farran point bears S.E. by E. in order to clear the Middle ground.

Buoys.—There are three *red* buoys moored off the town for the convenience of mail steamers, but it is recommended for vessels of war to lie at their own anchors.*

Anchorage.—To anchor a large vessel off Freetown, bring fort Thornton to bear about S. by W., and King Toms point W. by N., which position will be 2 cables from the shore, in 17 fathoms, muddy bottom, and where a vessel may moor with open hawse to the northward. Small vessels generally anchor within the line of Farran and Lookout points, where very little tidal stream is experienced.

Supplies.—There is a naval depôt at Freetown, from which provisions, coal, and water can be obtained. Coal is brought alongside with great dispatch, in lighters holding 7 tons.

Approaching by night.—When approaching Sierra Leone by night, from the northward, the light should not be brought to bear west of S.S.W. ½ W., to avoid the Middle ground; and if from the southward and westward, keep the light bearing southward of E. by S. ½ S. to avoid Carpenter rock. After passing the cape, the *green* light at the extremity of the government wharf will guide to the anchorage; but should the light on the cape not be seen, vessels are advised to anchor, in order to make sure of their position, as the tide and current sometimes combine in sweeping them out of sight of the land before morning, or even into the dangerous vicinity of St. Ann shoals.

Turning marks.—When working in or out of Sierra Leone river (which must never be attempted unless with a favourable tide), stand no nearer the Middle ground than 7 fathoms, nor with an ebb tide to within three quarters of a mile of Carpenter rock. King Toms point, in line with the centre Barrack, bearing S.S.E. ¾ E. leads clear of the west extreme of the Middle ground.

Tides.—It is high water, full and change, in Sierra Leone river at 7 h. 50 m.; springs rise 12½ feet. In the rainy season the ebb stream runs with great strength, sometimes at the rate of 6 knots an hour; but in the dry season the velocity of neither tidal stream exceeds 2½ knots an hour.

Leaving Sierra Leone.—When proceeding to the northward, the light on the cape bearing S.S.W. ½ W. leads west of the Middle ground in 4 fathoms, but before altering course for the northward, the light should be brought to bear S. by E., or more easterly if the flood stream should be making.

Pilots.—Vessels intending to proceed up the river beyond Freetown, must take a pilot from that place; for although there is no danger by steering E.S.E. for 5 miles from the anchorage, yet, beyond that distance, the navigation becomes intricate. The pilot boat carries a blue and white horizontal flag.

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* Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

Soundings.—Between Sierra Leone and the Isles do Los, although shoals extend some distance from the land, no danger need be apprehended if the soundings are strictly watched, and a 7-fathom line maintained.

False cape.—Southward from cape Sierra Leone for a distance of 4 miles, the coast forms a slightly indented bay, bordered with trees, and terminating in a double rocky point, named False cape, which bears S. by W. ½ W. from cape Sierra Leone. From thence to cape Shilling the coast trends S. ½ E. for a distance of 18 miles; there is a small village situated at the entrance of York river at 6 miles north of cape Shilling.

Shilling cape is low and covered with trees; from a distance of 10 or 15 miles it appears like a small island. At this cape the mountains of Sierra Leone terminate, after forming a high double range, which is visible from a great distance. The southern extremity of the range is the most elevated, and though its summit is generally enveloped in clouds, it is often seen from a distance of 40 or 45 miles. Kent town, a village of liberated Africans, stands on the side of a hill near the cape.

Banana islands, lying 2 miles south-west of cape Shilling, very much resemble the Isles do Los, but the adjacent land is more elevated. They are extremely fertile, with plenty of water, though there are no running streams; considering their proximity to the African continent, they are comparatively healthy—so much so, that the European residents of Sierra Leone frequently resort there to benefit their health. The islands are three in number, lying in a N.E. by E. and S.W. by W. direction. The largest, which is the north easternmost, is not lofty. The middle island is volcanic, about 900 feet high, and covered with wood: it is separated from the north-east island by a narrow unnavigable strait,* and from the south-west island by a passage about 70 yards wide, in the centre of which there is not less than 18 feet. The south-west island is about 70 feet high, and rather more than a mile in circumference; being open to the sea breeze it is considered the most healthy of the group. A copious and permanent spring of fresh water is said to exist at its south-east extremity. A rock, which uncovers at half tide, lies W.S.W. from the south-west extremity of this island, distant half a mile, with foul ground between; a sailing vessel, without a commanding breeze, is recommended not to approach this rock within half a mile.

The channel between Banana islands and cape Shilling is obstructed by two rocks.

In February 1877 this strait had been filled up by the natives. H.M.S. *Spiteful*, 1877.

Anchorage.—Vessels may anchor off any part of the coast between cape Sierra Leone and the Banana islands; the best anchorage off the latter, although the bottom is uneven, being in 5 fathoms, at about 2 miles from the shore, with the north-east extremity of the islands bearing S. ½ E. During the tornado season, from a berth on the north-west side of the group, with the extreme bearing S.S.E. and S.W. by W., if a vessel parted, she would drift clear of danger.

H.M.S. *Spiteful* in 1877 anchored off Banana islands in 8 fathoms, good holding ground, with Banana peak bearing E.S.E. and centre of middle island, bearing S.S.E. ½ E.

Yawry bay.—Tassa point lies 18 miles S.S.E. from cape Shilling, and west from it extends the Plantain islands and Bengal rocks, forming the northern side of the entrance to Sherbro river. The space included between Banana and Plantain islands is named Yawry bay, into which several rivers and creeks discharge their waters; the shores of this bay are unapproachable, being fronted by a reef extending 4 miles from the coast, many parts of which are dry at low water.

Tassa point, on which there is a native village, is somewhat high on its northern side, sloping to a sandy beach on the south.

Plantain islands are low and wooded, nearly connected with Tassa point by a chain of rocks, above and below water.

Bengal rocks consist of two groups, the western, above water and of a black colour, are situated W. by N. from Tassa point distant 5 miles.

A dangerous shoal, on which there is a depth of 9 feet, lies W.N.W. from the western Bengal rock, distant 1½ miles.

SHERBRO RIVER.*—Sherbro river is bounded on the north side by the mainland, and on the south by Sherbro island. Though locally known as Sherbro river, it is more correctly described as a sound or strait. The width of entrance to this river is 21 miles, from Tassa point on the north, to cape St. Ann on the south. This width decreases rapidly on advancing eastward; and abreast of the village of Jenkins it is only 3 miles wide. Four rivers fall into the Sherbro river from the north and east—the Yaltucka, at 11½ miles S.E. from Tassa point; Bagroo river, 16 miles further east; the Jong, 11 miles more to the south-east; and Boom-Kittam river, 8 miles beyond to the southward. This last has its outlet close north of Manna point, the eastern limit of Shebar entrance.

Coast.—The coast between Tassa point and Buoy point, on the north side of Sherbro river, is low and sandy, fronted by an extensive shoal bank, extending in some places 5 miles from the coast; between Yaltucka river and Buoy point the shore is thickly wooded.

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* *See* Admiralty plans:—Sherbro river, No. 617, scale, $m = 0{\cdot}6$ inches, and Sherbro river from Bagroo channel to Shebar, entrance, No. 633, scale, $m = 1{\cdot}2$ inches.

Buoy point, lying S.E. by S., distant 8 miles from the entrance to Yaltucka river, is clearly defined, and though low is visible for some distance; Mendo tree, situated about 4½ miles N.N.W. from Buoy point and half a mile from the coast, is high and round, being conspicuous for a distance of 7 or 8 miles. From Buoy point the villages of Jenkins and Jamaica on the south shore are visible, the former may be recognised by two large trees.

Sherbro island.—The northern coast of Sherbro island is fronted by extensive shoals, the western portion of which, known as Turtle and Sherbro banks, extends for a distance of 16 miles in a northerly direction from cape St. Ann, and restrict the width of the navigable channel at the west entrance of Sherbro river to 4 miles.

On the north coast of Sherbro island there are several clumps of trees, and two villages known as Jenkins and Jamaica.

Jamaica point, having on it several tall straight trees, is bold and dark looking.

Middle ground.—At Buoy point the main channel of Sherbro river is divided into two, by a shoal of irregular form about 7 miles long, known as the Middle ground, the northern part of which dries at low water; upon this bank there are several other places which also dry at low water.

Bagroo channel lies north of Middle ground, it is available at all times for vessels drawing 24 feet; the bottom is of soft mud.

Jenkins channel, which lies south of Middle ground, is intricate, and only available for small vessels, the eastern part being obstructed by a shoal, which lies between Jamaica village and the east extreme of Middle ground; the bottom in Jenkins channel is of hard sand.

Channel.—Between the east extreme of Middle ground and York island, the channel is narrowed by Bobs island, Rendall island, and Long island, all on the eastern side.

Bobs island flat is an extensive shoal, extending from the north extreme of Bobs island, and connecting it with the north extreme of Rendall island; the south extreme of Bobs island and the west extreme of Long island are well defined and steep-to.

When nearing Long island, the wharf and European houses on York island become visible.

After rounding York island, the village of Bendo on the eastern shore comes in sight, and then Bonthe and Victoria on the western side, at each of which there are several European houses.

Bonthe is the residence of the government officials.

Between York island and Bendo great attention must be paid to the

steering of a vessel; barques of 300 tons ascend Sherbro river as far as Bendo.

Buoys.*—The Sherbro river was buoyed in 1870 as far as York island, but no dependence can be placed on either the positions or numbers of the buoys.

In March 1877 the channel as far as York island was marked by:

A white fairway buoy moored in 4½ fathoms, from which Plaintain island bears E. ¾ S., distant 5 miles.

A buoy with a staff and ball, known as Carpenter buoy, moored in 12 fathoms, 2 miles east of the northern prong of Turtle bank, and bearing S. by E., distant 8½ miles from the white fairway buoy.

A black and white buoy moored in 9 fathoms, lying 3 cables north-west of the western edge of the shoals off the mouth of Yaltucka river.

A black buoy lying S.W. ¾ W., distant 8 cables from the southern extremity of Long island.

Directions.—From a position 1½ miles south of the white fairway buoy a S.S.E. ⅓ E. course for 9½ miles will lead 1½ miles eastward of Carpenter buoy, from whence a S.E. easterly course of 8 miles, will take a vessel to the black and white buoy, off the western edge of the shoals extending off the mouth of Yaltucka river; from this buoy, after steering S.E. by E. ¾ E. for 4½ miles, and then a S.E. ¼ S. course for 3¾ miles the vessel will arrive at the entrance to Bagroo channel.

A shoal of 10 feet, lying 8 cables south of Buoy point at the western entrance to this channel, should be passed to the southward, and a course of S.E. by E. ¼ E. for a distance of 6¼ miles, leads from thence to the eastern extreme of Middle ground.

From this the channel lies midway between the southern shore and the western edge of Bobs island flat, until within a mile of Jamaica point, when a narrow channel south of Bobs island is entered, in which there is only a depth of 19 feet at low water.

Between Bobs island south extreme and Long island, bring Jamaica village a little open south of Bobs island, and with this mark astern run to the western extreme of Long island, keeping along its southern shore; a black buoy marks the southern edge of a flat which must now be crossed; there is only 15 feet at low-water springs over this flat.

Having passed close to the eastward of this black buoy, continue on in mid-channel towards Macauley island, passing midway between it and the flats which partly dry and extend from the eastern shore of the river; next steer for Hutchinson island, and then close along its northern shore for York island, off which there is anchorage in 24 feet, mud.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1877.

Buoy point, lying S.E. by S., distant 8 miles from the entrance to Yaltucka river, is clearly defined, and though low is visible for some distance; Mendo tree, situated about 4½ miles N.N.W. from Buoy point and half a mile from the coast, is high and round, being conspicuous for a distance of 7 or 8 miles. From Buoy point the villages of Jenkins and Jamaica on the south shore are visible, the former may be recognised by two large trees.

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Bagroo channel lies north of Middle ground, it is available at all times for vessels drawing 24 feet; the bottom is of soft mud.

Jenkins channel, which lies south of Middle ground, is intricate, and only available for small vessels, the eastern part being obstructed by a shoal, which lies between Jamaica village and the east extreme of Middle ground; the bottom in Jenkins channel is of hard sand.

Channel.—Between the east extreme of Middle ground and York island, the channel is narrowed by Bobs island, Rendall island, and Long island, all on the eastern side.

Bobs island flat is an extensive shoal, extending from the north extreme of Bobs island, and connecting it with the north extreme of Rendall island; the south extreme of Bobs island and the west extreme of Long island are well defined and steep-to.

When nearing Long island, the wharf and European houses on York island become visible.

After rounding York island, the village of Bendo on the eastern shore comes in sight, and then Bonthe and Victoria on the western side, at each of which there are several European houses.

Bonthe is the residence of the government officials.

Between York island and Bendo great attention must be paid to the

steering of a vessel; barques of 300 tons ascend Sherbro river as far as Bendo.

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A black and white buoy moored in 9 fathoms, lying 3 cables north-west of the western edge of the shoals off the mouth of Yaltucka river.

A black buoy lying S.W. ¾ W., distant 8 cables from the southern extremity of Long island.

Directions.—From a position 1½ miles south of the white fairway buoy a S.S.E. ⅓ E. course for 9½ miles will lead 1½ miles eastward of Carpenter buoy, from whence a S.E. easterly course of 8 miles, will take a vessel to the black and white buoy, off the western edge of the shoals extending off the mouth of Yaltucka river; from this buoy, after steering S.E. by E. ¾ E. for 4½ miles, and then a S.E. ¼ S. course for 3¾ miles the vessel will arrive at the entrance to Bagroo channel.

A shoal of 10 feet, lying 8 cables south of Buoy point at the western entrance to this channel, should be passed to the southward, and a course of S.E. by E. ¼ E. for a distance of 6¼ miles, leads from thence to the eastern extreme of Middle ground.

From this the channel lies midway between the southern shore and the western edge of Bobs island flat, until within a mile of Jamaica point, when a narrow channel south of Bobs island is entered, in which there is only a depth of 19 feet at low water.

Between Bobs island south extreme and Long island, bring Jamaica village a little open south of Bobs island, and with this mark astern run to the western extreme of Long island, keeping along its southern shore; a black buoy marks the southern edge of a flat which must now be crossed; there is only 15 feet at low-water springs over this flat.

Having passed close to the eastward of this black buoy, continue on in mid-channel towards Macauley island, passing midway between it and the flats which partly dry and extend from the eastern shore of the river; next steer for Hutchinson island, and then close along its northern shore for York island, off which there is anchorage in 24 feet, mud.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1877.

Buoy point, lying S.E. by S., distant 8 miles from the entrance to Yaltucka river, is clearly defined, and though low is visible for some distance; Mendo tree, situated about 4½ miles N.N.W. from Buoy point and half a mile from the coast, is high and round, being conspicuous for a distance of 7 or 8 miles. From Buoy point the villages of Jenkins and Jamaica on the south shore are visible, the former may be recognised by two large trees.

Sherbro island.—The northern coast of Sherbro island is fronted by extensive shoals, the western portion of which, known as Turtle and Sherbro banks, extends for a distance of 16 miles in a northerly direction from cape St. Ann, and restrict the width of the navigable channel at the west entrance of Sherbro river to 4 miles.

On the north coast of Sherbro island there are several clumps of trees, and two villages known as Jenkins and Jamaica.

Jamaica point, having on it several tall straight trees, is bold and dark looking.

Middle ground.—At Buoy point the main channel of Sherbro river is divided into two, by a shoal of irregular form about 7 miles long, known as the Middle ground, the northern part of which dries at low water; upon this bank there are several other places which also dry at low water.

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Buoys.*—The Sherbro river was buoyed in 1870 as far as York island, but no dependence can be placed on either the positions or numbers of the buoys.

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A white fairway buoy moored in 4½ fathoms, from which Plaintain island bears E. ¾ S., distant 5 miles.

A buoy with a staff and ball, known as Carpenter buoy, moored in 12 fathoms, 2 miles east of the northern prong of Turtle bank, and bearing S. by E., distant 8½ miles from the white fairway buoy.

A black and white buoy moored in 9 fathoms, lying 3 cables north-west of the western edge of the shoals off the mouth of Yaltucka river.

A black buoy lying S.W. ¾ W., distant 8 cables from the southern extremity of Long island.

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A shoal of 10 feet, lying 8 cables south of Buoy point at the western entrance to this channel, should be passed to the southward, and a course of S.E. by E. ¼ E. for a distance of 6¼ miles, leads from thence to the eastern extreme of Middle ground.

From this the channel lies midway between the southern shore and the western edge of Bobs island flat, until within a mile of Jamaica point, when a narrow channel south of Bobs island is entered, in which there is only a depth of 19 feet at low water.

Between Bobs island south extreme and Long island, bring Jamaica village a little open south of Bobs island, and with this mark astern run to the western extreme of Long island, keeping along its southern shore; a black buoy marks the southern edge of a flat which must now be crossed; there is only 15 feet at low-water springs over this flat.

Having passed close to the eastward of this black buoy, continue on in mid-channel towards Macauley island, passing midway between it and the flats which partly dry and extend from the eastern shore of the river; next steer for Hutchinson island, and then close along its northern shore for York island, off which there is anchorage in 24 feet, mud.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1877.

Vessels drawing 15 feet may proceed from York island to Bendo (a town on the eastern shore of the channel leading to Shebar entrance) with little risk, but the channel requires buoying.

From Bendo to Victoria (on the western shore) the channel cannot be used without the assistance of buoys, as it is very narrow, the greatest depth in it being only 14 feet at low water, and the tides running strongly.

Off Victoria there is a depth of 5 and 6 fathoms close to the shore ; good wharves could be easily and cheaply built for loading small vessels.

In navigating Sherbro river by the above directions, due allowance must be made for the tidal stream, which runs with an average velocity of 2 knots an hour.

Bagroo river forms a junction with Sherbro river north of Bobs island flat ; it takes a straight course for 5½ miles in a north-east direction, when it is joined by Raleigh river, above which junction its winding course has been traced for about 10 miles to the native town of Tasso ; Edmonstoen island, with a bank extending from its north-east and west sides, is situated at the mouth of Bagroo river, 1½ miles east of Falcon point, its northern entrance point.

The depth of Bagroo river, between its mouth and the junction with Raleigh river, varies from 3 to 5 fathoms.

Boom-Kittam river is entered immediately north of Manna point, the east entrance point of Shebar entrance, it is only accessible to boats : in the wet season this river rises about 12 feet at the lower part, and as much as 25 feet at the upper part.*

The head of Boom-Kittam river is only about half a mile from the outer coast.

Shebar entrance.—Sherbro river can be entered from the southward by a channel at the south-east extreme of Sherbro island, known as Shebar entrance: the entrance points, named West Sand head and Manna point, have long sand spits extending from them, on which the sea breaks at all times of tide ; between these sand spits is situated the bar.

From Victoria to Shebar entrance, the navigation of the channel is simple, but there is only 14 feet over the flats off Boom-Kittam river ; having passed these, the water quickly deepens to 6, 8, and 10 fathoms.

The dangerous state of the bar at the time of the Admiralty survey in 1870 prevented its being sounded, but the local pilots report that there is as much as 18 feet on it at high water. Vessels drawing over 10 feet, however, are not recommended to cross it even under favourable circumstances ; it is therefore of no use to the mail steam packets.

Caution.—There is reason to believe that the spits of sand at Shebar entrance are not stationary, and therefore, a vessel obliged to attempt an entrance, should send a boat to mark the extreme of one or both of them.

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* **Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1877.**

Anchorage.—H.M. vessels of war occasionally anchor off the entrance to Shebar river, and communicate by boat.

Tides.—It is high water, full and change, in Sherbro entrance at 6 h. 0 m., springs rise 11 feet; at Bobs island at 7 h. 50 m., springs rise 6 feet, and neaps 5 feet; and at Bendo flats at 8 h. 15 m., springs rise 4 feet, and neaps 3½ feet. The tidal streams in Shebar entrance are very strong, running at least 4 knots an hour at half tide during the dry season, so that during the rainy season this channel would probably be impassable.

The flood stream makes in Shebar entrance at 2 hours before it is low water at Bobs island, covering the banks near York and Macauley islands. When the tide is rising at Bobs island, the strength of the stream turns the tide coming from the Shebar entrance, which then passes between the islands and up Boom-Kittam river. The ebb also makes through Shebar entrance at 2 hours before it is high water off Bobs island, which latter place may be considered as the point where the tides meet.

Winds and weather.—On that portion of the coast between cape Verde and Sierra Leone the prevailing winds during the rainy season (June to September) are from the southward and westward, with squalls from S.W.; these prevailing winds are usually light.

During the fine season southerly and westerly winds are also occasionally experienced veering to N.N.W. in the afternoon.

Near the land (except during the winter season) land and sea breezes prevail with great regularity.

Harmattan.—The harmattan season commences with December, or rather earlier than off the Gambia, and extends through December, January, and February; occasional intervals of clear weather, accompanied by a refreshing sea breeze from the N.W., afford a respite to the oppressive effects of this wind. Nor does the harmattan blow uniformly either in the same direction or with the same strength; for it ranges through eight points of the compass from N.E. to S.E., and however fiery at the commencement, declines, after the first month, to a comparatively light breeze.

Tornadoes.—The tornadoes precede the rains sometimes by as long as a month, and again return after the rains have ceased. They blow from East to S.E. and towards the end of the tornado season occasionally from the Southward, with great fury, but seldom lasts more than three hours. They are generally preceded by the appearance of a light arch in the east, with dark clouds and occasional flashes of lightning. A dense white cloud in the centre of the arch foretells a powerful blast. The instant those appearances are perceived, all square sails should be furled, and the vessel put before wind, for which there is often barely sufficient time. Many of the slave vessels which formerly failed in reaching their destinations, are supposed to have foundered in attempting to lie to.

Rollers.—The surf on this coast is always extremely heavy, and the rollers sometimes curl in 5 fathoms and break tremendously in 3 or even in 4 fathoms. They may generally be expected at the latter part of the rainy season, and chiefly about the time of new moon; therefore, during this season, vessels should avoid anchoring in shallow water in unsheltered places, especially in the vicinity of a large river, as the ebb tide tends greatly to increase the danger.

CHAPTER IX.

SHOALS OF ST. ANN TO CAPE PALMAS.

Liberia, or Grain coast.

VARIATION IN 1880.	
Cape Palmas - - -	19° 45′ W.

Liberia.—The coast line of the Republic of Liberia commences at the river Sherbro.

Liberia was first colonized in 1822, and acknowledged as an independent Republic in 1847.

In 1877 the total population was estimated at 720,000.

Shoals of St. Ann.—The shoals of St. Ann commence near cape St. Ann, the western extremity of Sherbro island, and extend from it 45 miles in a north-westerly direction. They are very numerous, and are composed of knolls of fine light-brown sand, apparently deposits from the waters of the various rivers in their vicinity. The outermost or North-west patches have 15 feet ever them at low water spring tides; and from them the peak of Banana islands bears E. ¼ N., distant respectively 22 and 16 miles. Between these patches and Turtle islands, off cape St. Ann, the ground is more or less covered with others of similar character, which no description can represent so clearly as the Admiralty chart.

Fish.—Abundance of fish may be caught by anchoring in 10 or 15 fathoms, sand and shells, anywhere on the shoals; but during the rainy season, from June to September, the sea is generally rough.

Tides.—The tides into and from the bays and inlets north of Sherbro island, set across the Shoals of St. Ann with velocities varying from three quarters to 1½ miles per hour during the dry season, and it is probable that during the rains the ebb stream may much exceed this.

Directions.—There is a space of 15 miles between the North-west patches and Turtle islands, in which the knolls have not less than 14 feet water over them at low water; but nearer the shore, the depths become more irregular, and the shoal spots more numerous and extensive; and as Banana islands are generally obscured by haze during the dry season, so as to leave no leading object visible, it is recommended not to approach any part of the shoals of St. Ann. Vessels, therefore, from Sierra Leone bound to the southward, should give a wide berth to the North-west patches, and keep in more than 15 fathoms water, till they reach the latitude of 7° 40′ N.

They may then steer S.S.W., gradually edging to the southward and south-eastward along the outer edge of the shoals in about 20 fathoms, till they reach the meridian of cape St. Ann, from which position the coast being quite clear, they may proceed along it, in any depth or at any distance that may be desired.

Soundings.—On the parallel of St. Ann shoals, and 34 miles westward of them, the depth is 290 fathoms, shoaling gradually to 13 fathoms at a distance of 18 miles, when it increases to 15 fathoms; and that depth will be found at 3 miles from their western edge.

Turtle islands.—These islands, at the extremity of cape St. Ann, like the shoals off it, appear to be formed by deposits from the rivers near Sherbro island. They are sandbanks, gradually acquiring vegetation, and some already thickly wooded. They stand upon an extensive flat of sandy banks, and have no navigable channels between them.

Many natives are settled upon them, who appear to be well supplied with domestic fowls, fish, and bananas.

North island, the north-western of the Turtle islands, is situated 9 miles N.N.W. ¼ W. from cape St. Ann. The tops of its highest trees are 72 feet above the sea; and the highest upon any of the Turtle islands do not exceed 135 feet.

CAPE ST. ANN.*—This cape is a low, sandy point, forming the western extremity of Sherbro island. The narrow opening between it and Turtle islands is obstructed with sand.

Coast.—From cape St. Ann to the opening named Shebar entrance the distance is 28 miles in a S.E. ¼ E. direction; the coast between is formed by a sandy beach, free from off-lying rocks or shoals, and steep-to, having 5 fathoms close to the shore, over a bottom of fine sand. The land is thickly wooded, the forest everywhere advancing to within a few yards of the beach.

Shebar entrance.—*See* p. 204.

Coast.—From Shebar entrance the coast trends nearly in a straight line S.E. ¼ E. for about 60 miles to the entrance of the river Gallinas, and though low and sandy, it is free from off-lying shoals, and steep-to, with regular soundings from the offing.

Gallinas river.†—The entrance to this river is difficult to recognise from the offing.

The action of the surf from without, and the currents of the rivers Gallinas and Solyman from within, has had the effect of throwing up a narrow barrier of sand 5 or 6 miles in length, and of thus forming between it and the shore, a long, narrow lagoon, in which are several low, sandy islands, covered with trees. One or two shifting openings in this barrier allow the escape of the river water; and through them are the only channels by which boats can communicate with the lagoon and the shore.

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* *See* Admiralty chart:—Africa, West coast, Sheet IX., Sherbro island to cape Mesurado, No. 1,363.

† *See* Admiralty plan:—Gallinas river, No. 1,690; scale, *m* = 1·5 inches.

Bar.—The principal entrance in 1839, was at the western elbow of Kamasoun island, from whence a narrow channel will be found through the surf, round either its north or south extreme.

Anchorage.—The soundings from the offing are regular, and trading vessels may anchor at a mile west of the above islands in 7 fathoms; but vessels of war are recommended to anchor 3 or 4 miles off shore in 17 fathoms.

Landing is never practicable in ordinary boats, and none ought to attempt to cross the bar, or land through the surf without a native pilot.

Tides.—It is high water, full and change, in Gallinas river at 6h. 45m.; springs rise 4 feet.

Solyman river.—The Solyman, situated 3 miles south of Gallinas river, has the appearance of a considerable stream, but during the Admiralty survey in 1839 it was inaccessible except through the narrow opening into the lagoon already mentioned. A small wooded island stands conspicuously in its mouth.

Manna river.—At 6 miles south-east of Solyman river is situated the entrance of the small river Manna, which, though nearly closed by sand-spits extending from both sides, affords access to boats.

A small wooded island is situated in the entrance.

Manna point, low and rocky, with rocks above and below water extending a third of a mile from the shore, lies south-east of Manna river, distant 4½ miles.

The high land in the interior, north-east of Manna point, is visible from a considerable distance, and is the first seen when approaching the coast from the north-westward.

Sugury and cape Mount (Mahfah) rivers.*—At 8 miles south of Manna point is situated cape Mount, the coast between forming a bay about 2 miles in depth, into which flow the Sugury and cape Mount or Mahfah rivers. These rivers with Fisherman lake have a common outlet at 2½ miles north of cape Mount, across which the surf breaks heavily. Sugury river, extending 5½ miles in a north and south direction, and close within the outer coast, was found to carry a depth of about 6 feet. Mafnah river carries a general depth of 12 feet from Kroo town, at 1½ miles within the entrance, to Maquimbah, situated 10½ miles above the bar. Fisherman lake which is 10 miles long and 6 miles broad, has in it an average depth of about 10 feet.

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* United States vessel of war *Ticonderoga,* March 1879.

Mount cape.—The headland of cape Mount consists of several hills which rise to the height of 1,060 feet above the sea, and which when seen from a distance have the appearance of a large island. The western point of the cape is clear of off-lying dangers ; and the base of the mount, from thence for 3 miles to the south-eastward, is formed by a succession of rocky points and small sandy bays. There the coast again sinks into a low continuous beach of light-brown sand ; an unbroken forest covering the face of the country, up to the summit of the cape, and extending without intermission for 40 miles in a south-easterly direction to cape Mesurado.

Half Cape Mount river.—About half-way between capes Mount and Mesurado, there is a considerable stream named Half Cape Mount river, but in the dry season it is quite closed by a bank of sand which extends across its mouth.

Anchorage.—During the dry season H.M. vessels of war occasionally anchor in 12 fathoms, at 3 miles off shore, between cape Mesurado and Half Cape Mount river.

St. Paul river.*—At 8 miles south-east of Half Cape Mount river there is a small stream named the Po, the entrance to which may be known by a number of black rocks on the beach ; and 4 miles north of cape Mesurado there is a fine wide stream known as St. Paul river. A few rocks extend a quarter of a mile from the beach, for a distance of about 4 miles north of St. Paul river. From the south entrance point of the river a dry sandy spit extends to the north-west, terminating in a shallow bar, curving towards the northern shore, and leaving a narrow channel for boats, with 7 feet in it at low water.

Caldwell settlement.—On the banks of St. Paul river and along the outer shore, there are several native villages and some American factories, as well as a large settlement at Caldwell, 2 miles from the entrance, on the south bank of the river.

Mesurado river.—At 3 miles southward of St. Paul river, the Mesurado issues from behind the cape of the same name. Its entrance is rendered uncertain both in depth and position, for the sandbanks off it yield alternately to the westerly swell, and to the heavy freshes produced by the periodic rains breaking through ; sometimes it is found close to the foot of the cape, and sometimes half a mile to the northward, but usually there is from 3 to 9 feet on the bar, which is generally unsafe for any but surf boats.

Stockton creek.—This creek, 5 miles long in a N.N.E. direction, affords a back communication for boats between the Mesurado and St.

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* *See* **Admiralty plan :—Monrovia, No. 1,690 ; scale, *m* = 1·5 inches.**

Paul rivers ; the banks of this creek and Bushrod island, situated west of it, contain several thriving villages of American settlers.

Monrovia.—The principal establishment on this part of the coast is the town of Monrovia, which stands on the southern side of Mesurado river, immediately under the high land of the cape, and which is the residence of the president of the Liberian republic, and the seat of government.

Population.—In 1877 the population of Monrovia was estimated at 13,000.

Tides.—It is high water, full and change, in Monrovia bay at 6h.; springs rise 6 feet.

Mesurado cape.*—The north-west extreme of the peninsula of Mesurado is high in comparison with the adjacent land; it is of rocky formation, covered with vegetation, and steep to. When first seen from the westward it appears like an island.†

LIGHT.—From a lighthouse, painted red and situated on the summit of cape Mesurado, at an elevation of 240 feet above the sea, is exhibited a *fixed* white light, that is of small power, seldom seen more than 5 miles, and never to be depended on.

Supplies.—Wood and water can be procured here, but it is necessary to obtain the sanction of the authorities before sending Kroomen for the former. The *Ætna's* boats watered in the river about two miles up, filling their casks from the stream ; but during the dry season, it has been necessary to send boats nearly 7 miles up the river, to obtain water in any considerable quantity. Fresh meat, vegetables, and various small stores are occasionally to be obtained from the settlers at the town.

Anchorage.—The usual anchorage for large vessels in Monrovia bay is in 7 fathoms, sand, with the west extreme of cape Mesurado bearing S. ¾ W., the lighthouse bearing S. ½ E., and the centre of the town S.S.E.

Landing.—The landing at Monrovia is bad, especially at spring tides.‡

Coast.§—From cape Mesurado to the south-east the coast is formed by a sandy beach, and the whole country is covered with forest. At 9 miles south-eastward from the cape there is a low point, off which lie a few rocks, and close within the point there is some high land. From thence to Junk river, a similar low coast continues for 20 miles, with lagoons between the trees and the beech, forming long narrow lakes with a few shallow outlets to the sea, and into which several rivulets appear to drain the water of the adjacent country. Two hillocks, named the Crown and the Coxcomb, lie north-east of the largest of those lagoons.

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* *See* Admiralty chart:—Africa, West coast, Sheet X., Cape Mesurado to cape Palmas, No. 1,365; and Admiralty plan:—Monrovia, No. 1,690; scale, $m = 1 \cdot 5$ inches.

† German Hydrographic Notice, No. 1 of 1874.

‡ Lieutenant O. Churchill, H.M.S. *Ariel*, 1876.

§ *See* Admiralty plan:—Junk river and Marshall, No. 1,690; scale, $m = 1 \cdot 5$ inches.

Hoopers patch.—N.W. by W. from the entrance to Junk river, distant 2¾ miles, and 6 cables from the shore, is situated a rocky shoal, named Hoopers patch ; it is of irregular form, about a mile in length, and the least depth of water on it is 2½ and 3 fathoms.

About 1½ miles south-east of Hoopers patch there is another small 3-fathoms shoal, from which Marshall point bears E. by N. ¼ N. distant 1⅓ miles, and Bassa point S.E. distant 2¾ miles. The ground immediately round it is in some places foul, but between it and the shore the bottom shoals gradually to 4 fathoms, at the steep edge of the bar which fronts Little Bassa and Junk rivers. To avoid this shoal, as well as Hoopers patch, vessels when passing should not come within the 10-fathoms line.

There is a passage 4 cables wide between these shoals and the shore, in which the depth is from 5 to 6 fathoms.

Vessels using this passage should keep near the shore in about 5 fathoms.

Junk river.—From Marshall point, its western entrance point, a tongue of sand, partly dry and partly covered with heavy breakers, extends three quarters of a mile to the southward, and close round the southern edge of these breakers is situated the entrance to Junk river. On the bar, there are only 4 feet at low water, and the channel is very narrow ; but inside it deepens to 1½ and 2 fathoms ; the deepest water is found by steering towards the eastern shore, round the hook at the extremity of the tongue of sand.

Marshall, a Liberian settlement, stands on the west side of Junk river, about a mile from the bar ; abreast of it there are 3 and 3½ fathoms. At about three-quarters of a mile above Marshall the Junk river divides into two branches, one running east and the other north-west ; the eastern branch is said to be navigable for a distance of 18 miles, with a depth in it of from 2 to 5 fathoms.

Little Bassa river.—The mouth of this river is situated one mile S.S.E. of Marshall point, but it is so completely obstructed by the prolongation of the sandy tongue from that point, that it is inaccessible even to boats.

Anchorage.—Vessels may anchor off either Junk or Little Bassa rivers in 7 or 8 fathoms, on a clear bottom of sand and mud ; northward of the parallel of Brazier point the ground is foul.

Bassa point, lying one mile south-east of Little Bassa river, is a small rocky cliff, thickly wooded, with sandy bays on either side. Inland from it distant 10 miles, and bearing N.E. by E., there is a remarkable hill named the Saddle, which rises 1,070 feet above the sea, and appears to be the western extremity of a range of high land, extending 24 miles in a south-east direction to mount St. John.

Long-reef point.—At 9 miles south-east of Bassa point is situated Middle Bassa, where there is another Liberian factory ; and at 3 miles farther in the same direction lies Long-reef point, so named from a barrier of rocks, which, commencing about one mile north of the point, extends parallel with the shore for a distance of about 4 miles, at a distance of 3 cables from the coast. The ground in the vicinity is all foul, and S. by W. ⅓ W. distant 2½ miles from the point, in the stream of 10 fathoms, there is a sunken danger with 4¼ fathoms on it.

Lagoons.—Between Bassa and Long-reef points there are some lagoons at the back of the beach, and at about 1½ miles south-east from the former point is situated a small red and white cliff, which renders the spot remarkable.

St. John river.—A slightly indented coast, wooded throughout, and apparently populous, extends from Long reef point to Grand Bassa point, a distance of 11 miles. North of the latter, distant 2½ miles, a considerable river, named the St. John, and two smaller streams, the Mechlin and Benson, discharge themselves through one common opening into the sea.

Grand Bassa.*—The American colonists of Liberia have two small settlements at St. John river ; Edina, situated on the northern side of the opening, and Grand Bassa on the opposite bank. As usual with almost all the rivers on this part of the coast, the entrance is obstructed by a shallow bar, the least dangerous passage over which is close to the sandy spot off Macdowell point, its southern entrance point. Inside, the water deepens to 2 and 3 fathoms, abreast of each of the settlements.

Landing at Grand Bassa at times is dangerous. In very fine weather vessels of 200 tons burthen have crossed the bar.†

The coast in the vicinity of Grand Bassa is low, but at about 10 or 12 miles inland, there is a chain of hills distinctly seen in clear weather.‡

Anchorage.—About a mile outside, or W. by S. of the opening of St. John river, there is good anchorage in 6 or 7 fathoms, black mud, with the northern houses at Edina bearing N.E.

Niobe reef.—Several patches of foul ground, and one dangerous reef, named the Niobe, on which the sea breaks furiously, lie north-west of the entrance to St. John river. The outer edge of Niobe reef is a mile off shore, and bears N.W. by W. ½ W. distant 2⅓ miles from the southern houses of Grand Bassa settlement, so that vessels standing in, should not bring them to bear southward of E. by S. ½ S.

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* *See* Admiralty plan :—Edina and Grand Bassa, No. 1,690 ; scale, *m* = 1·5 inches.

† Commander E. A. Stubbs, H.M.S. *Seagull*, 1872.

‡ German Hydrographic Notice, No. 1 of 1874.

Between Niobe reef and Edina point, the northern entrance point of St. John river, are situated two smaller groups of breaking rocks. One of these lies half a mile east of Niobe reef south extreme, the other 2 cables W.S.W. from Edina point.

Waterhouse bay.—Southward of Macdowell point the shore recedes a little, forming Waterhouse bay, which is full of detached rocks and reefs. The northermost of which, Snapper reef, lies half a mile W.N.W. from Waterhouse point, and always breaks.

Grand Bassa point, composed partly of sand and partly of rocks, forms the south entrance point of Waterhouse bay. From the point the Dhouat ridge of rocks projects a quarter of mile to the N.W., and extending the same distance from their extremity, a sunken reef, named Yellow Will, assists in sheltering from the sea the little nook known as Bassa cove. Bissaw river runs into this cove, but it is inaccessible to boats.

Tides.—It is high water, full and change, at Grand Bassa at 5h. 50m.; springs rise 4 feet.

Tobocannee.—At 4¼ miles S.S.E. ¼ E. from Grand Bassa point is situated Tobocannee, a large native village; the coast between being thickly wooded, and formed of small rocky points and sandy bays.

Tobocannee rock.—At nearly a mile south of the village the land assumes the shape of a low angular point with a projecting reef, which terminates in a detached block of stone a few feet above water, named Tobocannee rock; at about a mile W. by S. from the point, there is a sunken rock on which the sea constantly breaks.

Coast.—Continuing to the south-eastward from Tobocannee village, the coast is in general rocky, with some sandy bays between the points, and these are fronted by numerous reefs, which extend in some places half a mile from the shore, leaving a boat channel within them.

Young Sesters.—These reefs extend 8 miles along the coast, as far as Trade town, but their continuity is broken at Young Sesters, about 4 miles south-east of Tobocannee rock, a place with which trading vessels sometimes communicate; and the same opening admits boats to pass inside of the reefs to New Sess river, the mouth of which is always accessible to canoes.

Trade Town is large and populous, situated on the western bank of a small river about 4 miles south of Young Sesters; it has both an American and an English factory.

Trade Town rock.—At nearly 2 miles S.S.E. from Trade town and about a mile from the shore, there is an isolated detached rock, on which the sea always breaks.

Little Culloh or Currow river, 4 miles south-east of Trade Town, is small but accessible to boats, fresh water may be obtained there from both wells and springs; at the town there is good landing, under the shelter of a rocky point.

Little Culloh rocks.—At three quarters of a mile S.S.E. of the town of Little Culloh, and a cable off shore, there is a sunken rock; and farther on, in nearly the same direction, but more than half a mile off shore, there are several other rocks, with a channel of 3 fathoms between them and the mainland. The coast in the vicinity of these rocks rises in rocky cliffs to 40 and 60 feet above the sea, with large irregular blocks of granite on the beach, over which the sea breaks heavily.

Grand Culloh.—The entrance of Grand Culloh river, situated 5 miles south-east of Little Culloh river, is closed by rocks and sand; and from thence to the southward the shore becomes low and undulating, with a coast line formed by numerous rocky points and sandy bays, off which, at a distance from one to two cables, are some rocks with a passage for boats inside them. Grand Culloh village is situated 1½ miles south-east of the entrance to the river. Off Errick, close north-west of Grand Culloh village, there is a large black rock, connected by a reef to the shore.

Tembo river, 3½ miles south-east of Grand Culloh village, is a small stream half a mile northward of Tembo point, and only occasionally accessible to boats. There is a small British trading factory at Tembo.

Tobacco mount, a conical hill 880 feet high, situated 13 miles North of Tembo river is a valuable mark for recognising the anchorages on this part of the coast.

Fen and Manna rivers.—From Tembo river to Grand Cestos, the coast is low and thickly wooded, with a sandy beach and some off-lying rocks. The entrances to the Fen and Manna, two small stream, are situated in the above space; the former is nearly closed by a ledge of black rocks, but canoes can enter by keeping close to the shore on the western side of them; at the mouth of Manna river may be seen the remains of an old factory.

Fen rocks.—At three-quarters of a mile S.S.W. of Fen river are situated Fen rocks, on which the sea breaks; other sunken dangers lie eastward of them, and the soundings are very irregular for 5 miles between them and Manna rocks.

Manna rocks lie a little more than a mile from the shore, and N.W. by N. from the entrance to Cestos river distant 4 miles, they are of a black colour and a little above high water; a shoal bank extends half a mile south-east of Manna rocks. There are several sunken rocks in this vicinity, on which the sea breaks; one bearing from Manna rocks N. ½ W. distant 6 cables; another N.E. distant 4 cables; a third E. ½ S. distant 6 cables, and others at a distance of a mile bearing S. ½ E.; all of these may be avoided by keeping in the offing in not less than 12 fathoms.

Cestos bay.*— Cestos point lies 4 miles S.S.E. from Manna rocks, and between them is situated Cestos bay, in which the soundings are irregular both in depth and quality of bottom, which generally consists of coarse brown sand or black mud.

Anchorage.—Convenient anchorage in 5 and 6 fathoms will be found with St. George point, three quarters of a mile north-east of Cestos point, bearing S.E. distant about three quarters of a mile; and Cestos point bearing South. Wood and water may be easily obtained here.

Tides.—It is high water, full and change, in Cestos bay at 5h. 20m.; springs rise 4 feet.

Cestos river flows into the southern part of Cestos bay, its entrance is obstructed by an extensive bar extending from St. George point (off which are some large, black, detached rocks), to about a mile north of Isaac point, the northern entrance point.

A Liberian factory has been established on St. George point.

Bar.—In the middle of the bar (which breaks heavily) there are some rocks, lying 4 cables N.N.E. ¾ E. from St. George point, which divide the channel into two parts, but in neither of them is the depth more than 9 feet at high water. The floods during the rainy season, however, produces such changes in the spits which project from the rocks, or from the opposite points, that it is always advisable when entering, to employ a native to pilot the boat. After crossing the bar the water deepens to 2½ and 3 fathoms, but again shoals, when past the narrows, to one fathom.

Cestos reef.—Off Cestos point there is much foul ground; a broad reef projects from it for a distance of half a mile to the westward; a rock with 3 feet on it lies close west of this reef; and S.S.W. distant 1⅓ miles from the point, a schooner is reported to have struck in 11 feet, though 5 fathoms was the least depth the surveying boats could find in the assigned position.

Spence rock, on which there is 12 feet water, and which usually breaks, lies W. ⅔ S. distant 1¼ miles from Cestos point; from the rock, the factory on St. George point bears E. by N. ¾ N.

Directions.—Cestos reef and the above-mentioned rocks are the more dangerous, because they are all so steep that the lead can give little or no warning of approach. As no good clearing marks can be given, a stranger should employ a pilot in entering the bay for the first time. A vessel passing along the coast may avoid them all, by keeping outside of the depth of 14 fathoms.

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* *See* Admiralty plan:—Cestos bay, No. 1690; scale, *m* = 1·5 inches.

Pooah and Pobamo rivers.—From Cestos point southward to Rock Cess factory the coast forms a sandy bay, interrupted by two small rivers—Pooah, 3½ miles eastward of the point, and the Pobamo, distant 7 miles in the same direction. The former is quite closed by rocks and sand in the dry season, but during the rains it is entered by canoes. The Pobamo carries 6 feet water, and may be entered close to the beach on the north-west side, where the water is tolerably smooth, being there sheltered by a ledge of rocks which extends from the south-east point of the entrance, and forms a kind of natural breakwater.

Pobamo rocks.—Westward of this ledge, and extending to Rock Cess factory, with a passage inside of it for boats, there is a broad reef, which commences about a mile W.N.W. of the mouth of Pobamo river. Westward of this reef there are several rocks, two of which always show. Pobamo rock is low and black, from it the south-east entrance point of Pobamo river bears E.S.E., distant 1¾ miles; a small sunken danger bears N.E. from Pobamo rock, distant half a mile, and another rock bears N.W. ½ N. from it at the same distance.

A rock above water, and, like those which have been described, steep-to and isolated, lies S.W. ½ W. from the entrance to Pobamo river, distant one mile.

New River.—A small river runs into the sea at Rock Cess point, and a factory will be seen a little farther to the south-east. At a mile south-east of the factory lies New river. The intermediate bay is obstructed by sunken rocks, though boats will find a passage of 4 and 5 fathoms between them.

Diabolitos reef.—New river is sheltered by an extensive reef, upon which are several black rocks which retain their Portuguese name of Diabolitos. Foul ground with irregular soundings extend fully 2 miles to seaward of this reef, and though nothing less than 3 fathoms was found, yet on the two shoals of 4½ and 5½ fathoms, situated 2 miles south-west of New river, the sea was seen to break.

Broonee river.—At a mile south of New river there is another rivulet without a practicable entrance; and at 2 miles farther south, a long spit has been formed by Broonee river, which is seen over it, running in a parallel line to the coast for upwards of a mile and a half. In the rainy season the freshes occasionally break through this spit, and convert it into a long narrow island. The entrance is always open to light boats and canoes, though much obstructed by rocks and sands.

Baï Yah or Devil rock.—There are several rocks off Broonee river, both above and under water: the most conspicuous of them is the Baï Yah, situated one mile from the shore, standing 60 feet above the sea, and capped with dark shrubs. Northward of it, distant 1½ miles, there are three sunken rocks which generally break; to the eastward, between it and a factory, standing on the shore 1¼ miles south-east of Broonee river, known as Spence factory, there are some rocks above water, with a detached reef to the southward of them, and an isolated danger west of them.

Baï Yah rock appears white when seen against the coast line.*

Westward of Baï Yah rock there are four other rocks. The nearest, which is dry, lies half a mile S.W. ½ W. from it; the second (Outer rocks) bears S.W. ½ S., a little more than a mile distant, and is of some extent, part of it shows above water; a third, bearing W. by S. ½ S. and nearly a mile and a half distant, is small, but carries only 4 feet water; and the fourth, lying N.W. by N. from the rock, distant not quite a mile, is only seen by its breakers.

Sangwin river.†—Eastward of Spence factory the coast forms a bight, and then, after passing the small river Coozoo, and two miles of straight sandy beach, the Sangwin river is reached. This is one of the principal streams that water this part of the coast. At first sight it is difficult to perceive the entrance, as a long ledge of rocks from the southern entrance point (Wilson point), and a high sandy spit from the northern point, seem both to cross over to the opposite shores; but it is possible to carry 10 feet water into the river, by keeping in the deepest channel, which will be found between Wilson point, and the rocky shoal a quarter of a mile westward of it. The channel is very narrow, and on rounding Wilson point it deepens to 5 fathoms till the narrows are passed.

Fresh water.—Towards the last quarter of the ebb tide the water at Sangwin point, on the north side, just within the entrance, is fresh and good; and when the bar is smooth, it will be found a convenient place for obtaining wood and water.

Tides.—It is high water, full and change, in Sangwin river at 5h. 15m.; springs rise 4 feet.

Lagoon.—Close east of Sangwin river, and just within the beach, there is a lagoon with three branches, which in the rainy season are probably connected with the river.

Baffou point lies nearly 5 miles S.S.E. from the mouth of Sangwin river, the intermediate coast receding so as to form a deep bay (Baffou bay), into which two small rivers discharge close north of the point, and in which there is much foul ground, though the beach seems to be generally clean.

Baffou rock.—Vessels working along shore should not approach this coast too closely, for Baffou rock, on which there is but 12 feet water, lies in the middle of the bay, bearing from Baffou point N.W. ¾ N., distant 2⅓ miles, and from Wilson point, at the mouth of Sangwin river, S. ¾ E. distant 2¾ miles.

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* Navigating lieutenant W. H. Turner, H.M.S. *Spiteful*, 1877.

† *See* Admiralty plan:—Sangwin river, No. 1,690; scale, *m* = 1·5 inches.

Baffnee river.—The northernmost of the two rivers lying north of Baffou point, is named the Baffnee, and has a very narrow entrance, 6 feet deep; the other is closed by a shallow sand bar, and the rivers are connected by one of those narrow lagoons, which are so common on this part of the coast.

Directions.—Baffou point should not be approached within half a mile to the westward, as there is a sunken rock off its pitch; another rock lies close southward of it, and irregular reefs three-quarters of a mile in length project to the northward. A fair anchorage, however, may be taken in 8 fathoms, mud and sand, with the point bearing S.E. ½ S. about a mile distant.

Coast.—From Baffou point to Tassou point the coast trends south-east for a distance of 6½ miles. A low and thickly-wooded country lies between them, with several streams of water barred up by the beach; many rocks lie near the shore, as well as at a short distance in the offing.

Krou country.—About this part of the coast the Krou country begins; and its inhabitants, whose superior industry and docile habits, when compared with other African tribes, are proverbially known, seem very numerous. During the Admiralty survey, parties came off from every village, expressing a great desire to trade.

Toobah river.—Between Tassoo point and the next point of land to the southward, issues the small river Toobah, in front of which there is a high rocky ledge, which divides the channel; the western branch is the safer, but at low water there are not more than 3 feet in it.

Sha rock.—Off Tassoo point, and in the stream of 9 or 10 fathoms, there is a long range of rocks and dangers; three of them are above water, the Sha, Wya, and Keoba. Sha rock lies 2 miles W. by N. ¾ N. from Tassou point; there is deep water round it, except to the northward, in which direction breakers extend about 300 yards.

Wya rock.—This rock bears S.S.E. ¾ E. from Sha rock, distant 1½ miles, and S.W. by W. from Tassoo point; it is a large rock, with reefs half a mile in length, extending both to the northward and southward.

Keoba rock.—At about a mile south-east from the southern reef off Wya rock, and S. by W. ¾ W. from Tassoo point, there is a rock with 9 feet over it; and at another mile, still farther to the south-east, is situated the large rock above water named Keoba. South-east distant one mile from Keoba rock there are breakers; and at 3 miles S.S.E. ¾ E. from it, with Bootou point bearing E. by N., lies Yule rock, the southern of this chain of dangers, which extend almost 7 miles from Sha rock, in a direction nearly parallel to the coast.

Little Bootou is a large village situated about two miles south-east from Tassoo point, and 4 miles farther in the same direction is Grand Bootou on a projecting point of the coast, behind which lies the mouth of Grand Bootou river. In the space included between the line joining Keoba and Yule rocks and the shore, and between Little and Great Bootou, the general depth is 6, 7, and 8 fathoms, but interspersed with many shoals, the particular description and positions of which would be useless. The shore is likewise covered with large rocks; several small rivulets expend themselves in the sandy beach, and the whole coast is densely peopled.

Grand Bootou.—Grand Bootou point is easily recognised by its projecting form, by the town upon it, and by a hill a mile to the south-eastward, covered with trees, and 266 feet high. A river winds round between the foot of this hill and the coast, after having run for several miles parallel to the shore, and is apparently a branch of the river Sinou. A few rocks lie close off Grand Bootou point, but from thence to Sinou bay the coast, though low, has a clean sandy beach, and between Yule rock and Sinou bay there are no detached shoals, so that vessels may stand in with safety; the soundings, however, are irregular, with occasional patches of rocky ground, necessitating care in anchoring.

Bloobarra point.—This point forms the southern extremity of Sinou bay; it is composed of three small rocky points with sandy bays between them. North point, at the mouth of Sinou river, is about 57 feet high; the middle point, on which there is a small English factory, is 41 feet high; and the lands rises from the south point to a height of 60 feet.

Sinou bay.*—At about 150 yards north of North point there are some rocks above water named Allen rocks, with a clear passage between them and the point into Sinou river; another open passage will be found between Allen rocks and Middle reef; and a third between this latter and North reef, which extends nearly across to the northern shore. These reefs were the only dangers discovered in Sinou bay, and vessels may safely anchor at half a mile W.N.W. of Bloobarra point in 8 fathoms, but the bottom should be previously examined, for it contains several small foul patches, though generally a clean sand.

Sinou river.—There are three channels by which boats may enter Sinou river—between North point and Allen rocks—between Allen rocks and a large oval sandbank to the eastward of them—and between that bank and Fishtown beach. The first is the best, and by rounding North point closely, 5 or 6 feet may be carried over the bar at low water. The bar is very narrow, and, when crossed, the river suddenly deepens to 3 and 4 fathoms, but shoals again quickly after rounding Fishtown point, when the deepest water will be found close along the northern shore. Water and wood may be obtained here.

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* *See* Admiralty plan :—Sinou bay, No. 1,690 ; scale, *m* = 1·5 inches.

The American Colonization Society have built a factory on the right bank of Sinou river, a little to the northward of Fishtown point.

Tides.—It is high water, full and change, in Sinou bay at 5h.; springs rise 4 feet.

Bloobah and Plassa rivers.—At 2 miles south-eastward of Bloobarra point the sandy beach is interrupted by a rocky projection, about a mile inland of which a small round hill will be seen, but with that exception the coast preserves its straight, low, and sandy character for 11 miles in a S.E. ½ E. direction to Little Krou, and a long narrow lagoon parallel to the shore, extends the whole distance, separated from the sea only by a narrow ridge of sand. This lagoon is supplied by two rivers, the Bloobah and Plassa, and a single opening through the sandy barrier serves as a common outlet to the sea for both of them. Little Krou river communicates also with the lagoon, but in the rainy season it forces an opening for itself through the barrier. From Little Krou river the coast bends outwards to the rocky point of Settra Krou.

Dangers.—In the eastern half of the space between Bloobarra point and Settra Krou there are several off-lying rocks.

The westernmost of these lies about a mile from the beach, with mount Plassa bearing E. by N., and a little open north of the common opening of the Plassa and Bloobah rivers, which bears. E. ¾ N. It is very small, with 6 fathoms close round it, and generally breaks.

There is an extensive rocky shoal situated S. by W. of the above opening, and W.N.W. of the large tree at Little Krou ; some of the rocks on this shoal are above water, others covered, and some only just breaking, but all steep-to.

At a mile S. by W. of this shoal there is a single rocky head which generally breaks ; and even if it should not show, it may be easily avoided by keeping Krou rock bearing to the eastward of S.E.

Krou rock is a bare irregular shaped mass of stones, with 5 fathoms close round it, except to the eastward, where it is connected with other rocks and long reefs which extend in the form of an S, nearly to the point of Settra Krou. The western edge of Krou rock bears W. by N., distant 2 miles from that point, and though it is sufficiently obvious during the day, and the breakers generally audible at night, yet vessels are recommended after dark, to keep in the stream of 16 fathoms at least.

From the S-shaped reefs connected with Krou rock, other branches diverge to the north-west and north-east, so as nearly to fill the space between Little Krou and Settra Krou.

Little Krou.—At this settlement there is a palm-oil factory belonging to some English merchants, and ordinary boats may conveniently land under the shelter of a ledge of rocks which projects from the point. The large tree which marks the position of this village stands on its eastern side, and may be plainly seen from the offing.

Settra Krou.—At this settlement there is also a remarkable tree and a conspicuous house, which may be distinguished from a long distance. Boats may safely land on the north side of the point on which the village is situated; off the extreme of this point are situated some black rocks.

Kroubah.—From Settra Krou, the beach trends 3 miles to the south-eastward, with long ledges of dry rocks extending from the projecting points. At that distance is situated the village and river of Kroubah, the entrance to which in the rainy season is open, and at which cattle may be obtained.

Neatano point, situated 1¼ miles south of Kroubah river, is prolonged by a reef and off-lying rocks, which are nearly connected to the southern shoals off Kroubah river.

Sunken Dangers.—On the bearing of S.S.W. from Settra Krou, distant two thirds of a mile, there is a rock which breaks, with 7 fathoms close to it; about a mile W. by N. from Neatano point there is another breaker, with 10 fathoms close to; and in the space between those two rocks, but nearer to the shore, there are several detached shoals with deep water close to. In the stream of 14 fathoms, S. by W., ¾ W. distant 2½ miles from Neatano point, a rocky bank with 8 fathoms over it was found; and at 1½ miles E.S.E. of this bank, in the stream of 11 fathoms, the natives allege that there is a rock nearly awash; though the surveying boats could not find it, nor did the soundings indicate any rise in the ground, yet on this extraordinary coast it is possible that such a rock may exist, as most of the dangers are steep-to. For these numerous rocks, vessels whose business leads them in-shore must keep a sharp look-out, but those which are merely running along the coast, are advised not to approach it 3 or 4 miles, nor stand into less water than 25 fathoms.

Coast.—At three quarters of a mile south-east from Neatano point lies Tooto point, from which a reef extends half a mile to the southward. From thence to Nanna Krou village the coast is a low sandy beach fronted with many rocks; and mid-way between them is the outlet of the small river Dehweh, with a lagoon behind the beach about 1½ miles in length, which is supplied by the two branches of this river.

King Wills bay.—From Nanna Krou village the coast bends to the south-westward for a distance of one mile to King Wills point, forming King Wills bay, near the centre of which there is a small islet about 15 feet high, covered with brushwood. The shore appears to be well settled, and two small English factories have been established here for the collection of palm oil, there being tolerably good landing near them on either side of the islet, which affords some little shelter. There are a few rocks lying 2 cables north-west of the point of King Wills town, and others off the point two-thirds of a mile further eastward ; inside of these latter rocks there is a narrow 3-fathom channel.

Anchorage may be had in 10 fathoms, with King Wills point bearing E.N.E. distant 1½ miles, but foul ground exists north-west of that position.

Ooro river, west mouth. — The western mouth of Ooro river is situated 3¼ miles south-east of King Wills point ; the intermediate coast is low and sandy, with a lagoon inside the beach ; a short distance east of the lagoon there is a rocky shoal, lying 300 yards from the shore, with a 2½-fathoms channel between ; it is steep-to on its outer side.

Swallow rocks, consisting of two ledges which generally break, and a 4-fathoms rock half a mile south-west of them, are situated south-west of Ooro river, west mouth, distant 1¾ miles. From the southern ledge the West mouth of Ooro river bears N.E. by E. ¼ E. and is in line with a hill, 260 feet in height, which stands 2½ miles inland. There are 10 fathoms close to the ledges, and 8 fathoms within a cable of the south-west rock.

Ooro river, east mouth. — The eastern branch of Ooro river falls into the sea at 3 miles east of the western branch, and the whole space between is occupied by successive chains of rocks which extend more than a mile from the beach. This mouth is concealed from vessels in the offing by large granite boulders, but it, as well as the western branch, is accessible to canoes. Subono, or Little Wappi, a large native village, stands on the right bank of the river near its mouth.

Wappi point.—South-east from Little Wappi, distant 1½ miles across a small bay, is situated Wappi point, near which is a small lagoon which extends in both directions along the coast, and on the side of which formerly stood another native town named Great Wappi. The outlet of the lagoon is obstructed by rocks, and a broad ledge, partly above and partly under water, extends in a westerly direction for nearly a mile from the shore.

Flat island.—South from the western extremity of this ledge distant about a mile, and S.W. by S. from the opening of the lagoon, there is a rock named Flat island, known to the natives as Totwarrah. There are 10 fathoms within half a mile of this rock to the westward and southward, but on its eastern side, reefs and shoals extend nearly to Middle Nifou, extending far to the southward, and almost filling the whole space between the outer reef and the shore.

Caution.—At about 3½ miles S.W. from Flat island, a sunken rock was found by H.M.S. *Sappho*, in 1856, but its exact position is not known.

Landing.—Inside of these reefs, and therefore sheltered by them, there is good landing at Little Nijou, on the western side of a rocky point, on each side of which there are streams of water that are open in the rainy season.

Middle Nifou.—At this place there are two small rivers, one coming from the north-west and the other from the north-east; they unite in a short lagoon, the outlet of which is open only in the rainy months. The town lies between these, and a mile farther eastward there is another native town named Great Nifou, off which a shallow reef projects three quarters of a mile in a S.W. ½ W. direction, with a detached rock, on which there is 3 fathoms water, situated a quarter of a mile westward of the extremity of the reef.

Droo river.—At 2 miles south-east from Great Nifou, a stream of some magnitude, known as the Droo, falls into the sea, and carries 6 feet over its bar, inside of which it deepens to 4 fathoms. The best entrance is round the southern point, which is low and rocky, with some large off-lying rocks; the northern entrance point is a sandy spit, which extends well over towards those rocks. Off the mouth of Droo river there are several dangers; one of them, named by the natives the Drootah, is a large block of stone which is above water; a sunken reef extends from it to the westward, and to the northward there is a large patch of foul ground. A ledge, three quarters of a mile in length, lies south-west of the south entrance point of the river, but there is a 3-fathoms channel between them. Two breaking rocks may be seen to the eastward of this ledge, and the soundings in its vicinity as well as round Drootah rock are suspiciously irregular, with rocky ground; so that, unless with a view of communicating with the shore, no vessel should venture to approach it here within 20 fathoms, or at a distance of about 3 miles.

Esereoos river.—From the rocky southern point of Droo river, the coast trends in a south-east direction for about 2½ miles to Esereoos or Baddoo river, close to the mouth of which there is a large rock 20 feet high, and some detached rocks a little to the westward of it, as well as a sunken danger on which the sea breaks; there is a channel 2 fathoms deep, suitable for boats, close along the coast inside of all these rocks.

Baddoo.—Baddoo consists of four towns, which stand on the coast on the western side of the entrance of Esereoos river; in their vicinity the ground has been well cleared by the natives, and produces abundance of rice.

Landing.—There is tolerably good landing under the lee of the large rock above-mentioned. The entrance of Esereoos river is only passable by canoes.

Dead islet.—Baddoo point curves to the southward from the mouth of Esereoos river; it is low and sandy, but half a mile off its pitch there are several rocks above water (the largest of which is named Dead islet) and several outlying reefs.

Baddoo shoals.—The outermost of these dangers bears W. ¾ N. from Dead islet, distant 2 miles, and another shoal head lies N.W. by W. half a mile from the same islet; the several dangers in this vicinity are known by the general name of Baddoo shoals.

Monkey rock.—This rock lies S. by E. distant 2 miles from Dead islet, and between them are several reefs and rocks, some of which show above water; Monkey rock lies 1¼ miles from the shore, and, like the breaker to the westward of it, is in the stream of 10 fathoms; the soundings for half a mile south-westward of it are irregular, and the bottom foul and rocky.

Castle rock.—Several isolated rocks are scattered along this part of the coast; a large one named the Castle bears S.E. by E. ½ E. from Monkey rock, distant 2⅓ miles; it rises steeply from a depth of 10 fathoms, and is about half a mile from the beach; vessels should not stand so far in as to bring these two rocks on opposite bearings.

Between the two points abreast of Dead islet and Castle rock there are several small rivers and lagoons, but they are all barred in the dry season. There is a safe channel for boats with 2 or 3 fathoms in it within 200 yards of the beach, leaving the shoals and islets outside to seaward.

Feroowah river.—These shoals terminate about a mile eastward of Castle rock, and from thence to the river Feroowah the sandy beach is straight and safe to approach. Feroowah river, with its apparently large opening, is only accessible to boats and canoes when the bar is smooth; its western entrance point is a low spit of sand, the eastern point a bold rock, on which stands the native town of Katoo.

Katoo rocks.—Rocks and boulders again front the coast at Feroowah river, there being three rocks above water near its entrance, with reefs extending from them nearly half a mile to the southward.

A large rocky shoal was found at a distance of nearly 2 miles W. by S. of Katoo point, with only 6 fathoms on it; and nearly in the same direction, but 5 miles off-shore, several canoes were fishing in the depth of 20 fathoms, on a still larger patch of foul ground.

Information likewise was obtained of the existence of a third shoal of 7 fathoms, lying in the stream of 19 fathoms, but the surveying boats failed in finding it.

Pahoo rock, with two rocky heads above water, lies in the stream of 9 fathoms, and bears S. by W., distant 1½ miles from the mouth of Feroowah river.

Coast.—From Katoo point to Subboo point, a distance of 3 miles, the coast forms four sandy bays with rocky points, and is fringed by many large rocks above water and breakers, inside of which there is a boat channel. The native towns of Picaninny Sesters and Wayako are situated on this coast.

Picaninny Sesters may be recognised by three small hills, situated 4 miles east of the town.

Rocks.—In front of Wayako, at nearly a mile from the shore and two-thirds of a mile E.S.E. of Pahoo rock, there is a shoal of 3 fathoms, with deep water on either side of it.

Subboo rock, large and black, lies N.W. by W., distant two-thirds of a mile from Subboo point.

A sunken danger lies between Subboo rock and the shore.

A dangerous rock, with 10 fathoms round it, is situated S.W. by W. ½ W. from Subboo point, distant one mile; and two shoals carrying 2½ and 3 fathoms lie S.S.W. from the same point, distant one-third and two-thirds of a mile respectively.

Sesters point.—From Subboo point, a low sandy beach, clear of rocks, extends 1½ miles to the south-eastward, and then turns more to the southward towards Sesters point, off which are numerous shoals and rocks.

Carpenter rock.—This large rock bears S. ½ E., distant one mile from Sesters point; from the rock the highest part of Sesters hill bears N. by E. ¾ E. It may be safely approached from the southward, but a long chain of rocks, above and under water, extends from it towards Sesters point, round which there is a very narrow 4-fathoms channel.

Grand Sesters river.—Behind Sesters point Sesters hill rises 210 feet above the sea, but between the hill and the point there is a narrow lagoon close inside the beach, nearly 3 miles in length, into which Grand Sesters river pours that portion of its waters which cannot find sufficient vent over the bar. The mouth of this river is about a mile eastward of Sesters point; its western entrance point is low and sandy, while the eastern point is rocky, with a ledge extending from it almost across to the opposite shore, so as to leave a very narrow entrance, through which boats can pass only when the water is tolerably smooth.

Factory Island.—On a rising ground near the eastern entrance point of Grand Sesters river, stands the large native town of Grand Sesters, and two English factories, in front of which a large rock, named Factory island, sufficiently breaks the swell to allow boats to run upon the beach with tolerable security.

Anchorage.—Vessels generally anchor in 13 or 14 fathoms on a muddy bottom, with Factory island bearing N.N.E. about a mile distant.

Ranger point.—At 2 miles eastward of Factory island is situated Ranger point, with a large native village on it. The point is rocky, but the intermediate coast is a sandy beach with a few detached rocks off it, and a boat channel of 2 fathoms inside them. Some rocks lie off Ranger point, extending to a distance of 300 or 400 yards. At a mile N.E. by E. from Ranger point, the land rises into a kind of table-shaped hill, densely wooded, the tops of the trees attaining an elevation of 190 feet; and on the same line of bearing, 2 miles farther inland, there are two little hummocks which are named the Paps.

Coast.—From Ranger point for a distance of 8 miles to the eastward, the coast is low and thickly wooded, with a clean sandy beach, free from off-lying rocks as far as a small river, which was open, though the surf on the bar did not permit the surveying boats to enter. Both points of the entrance are low and sandy, and there is a village on the eastern point. This river comes from the northward, with a small branch from the westward. N. by E. ¾ E. from its mouth, and 15 miles inland, there is a hill 730 feet high, which from its shape is named the Sugar-loaf; several small hillocks lie between it and the shore. There is also a remarkable grove of trees situated 1½ miles east of the eastern entrance point, so that this part of the coast is easily recognized.

Garraway river.*—An uninterrupted sandy beach extends 7 miles from this small river to Garraway or Tryh river, the northern side of the entrance to which is formed by a long low spit of sand, on which are situated two native villages known as Bushman town.

Garraway river is accessible at all times to caones, and to ordinary boats in moderate weather; the usual channel into it lies between the spit extending from the north entrance point, and a large rock above water near the middle of the entrance, which is connected with Garraway point (the south entrance point), by a chain of smaller rocks; in the middle of this channel there is a sunken rock.

Bushman reef.—In front of Bushman town, a shallow reef extends off shore for a distance of half a mile. Two shoal rocks lie W.N.W. of this reef, one distant half a mile, and the other a mile from it; the latter is three-quarters of a mile from the shore, and there is a depth of 6 fathoms in the channel between the eastern rock and Bushman reef.

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* *See* Admiralty plan:—Cape Palmas and Tabou river, No. 1,697; scale, m 1·0 inches.

Garraway point, on the southern side of the entrance, is rocky, with large rocks, some above and others under water, extending south and west from it.

Rocks.—South-west of the rocks extending from Garraway point, with a narrow channel of deep water between, there is an irregular shaped reef of considerable extent named Long patch, its north-west and south-east extremes bearing from Garraway point W. by N. and S. ½ W., and its southern angle bearing S.W. by S. a mile distant. Another reef, of an oval shape, named Tryh rocks, lies immediately westward of Garraway point; there is a channel into the river both east and west of it. Solitary rock lies in the stream of 9 fathoms, bearing from Garraway point W. ¾ N., distant 1½ miles.

Garraway tree.—There is a remarkable tree behind Garraway town, the top of which is 200 feet above the sea; it lies N.N.E. distant three-quarters of a mile from the point, and is used as one of the objects to distinguish the position of Coley rock, which lies 7 miles in the offing. In the direction of the tree, but nearly a mile farther inland, there is also a conspicuous clump of trees.

Green islet, the eastern extremity of which is high, lies a mile eastward of Garraway point; it is situated in the middle of a large breaking shoal, between which, and some sunken rocks near the beach, boats may pass in 2½ fathoms.

Jidah river.—From Garraway point the distance is 8 miles in a S.E. by S. direction to Fish Town point, the coast between forming a bay with a sandy beach. In this space are the entrances to three small streams; Jidah river, which is the westernmost, is closely barred by sand during the dry season; at a mile westward of this river there is a rocky danger a quarter of a mile off shore, with a 4-fathoms channel inside it, and 7 fathoms close to seaward. The Jidah, which flows from the north-east, appeared to communicate with Garraway river by a narrow lagoon, parallel to the coast. The town of New Garraway is built on the eastern side of the entrance.

Deeah river, a small stream, the entrance to which is open, and sometimes passable for boats, lies 3½ miles south-east of the entrance to Jidah river. From the mouth of Deeah river, a long reef on which the sea breaks with violence, extends W. ¾ N. for a distance of 2⅓ miles; on its outer extreme there is a very shoal head, close westward of which there are 8 fathoms, and on either side north or south of the reef 6 fathoms.

Manoh river.—In the bight of the bay, 1¾ miles south-east of Deeah river entrance, lies the river Manoh, which is also open, though but seldom accessible, from the high surf that rolls in along Fish Town point. About midway between Deeah and Manoh rivers a reef, which is steep-to, extends more than half a mile from the beach. A little rocky islet is situated close south of the mouth of Manoh river.

Fish Town point.—On this point, which rises about 40 feet above the sea, stands the large native town of the same name, and near it a factory for collecting rice, which abounds here. On the bearing of E. ½ N. from the point, distant 3¾ miles is situated the Table hill of Kablah, on the northern part of which there is a large tree, which stands 290 feet above the sea, and is a valuable mark for clearing the several dangers lying south-westward of cape Palmas.

Fish Town reef.—A reef projects two thirds of a mile in a westerly direction from Fish Town point, with 7 fathoms close round it; and there is a detached breaker with deep water close to it, lying one mile N.W. ¼ W. from the point.

Cape shoal.—South-west of these breakers, at the distance of 2 miles S.W. by W. ¼ W. from Fish Town point, is situated Cape shoal, a ledge of rocks always visible, the sea generally breaking on them with great violence, and sometimes also on two shoal heads a little to the eastward of the main shoal. The channel between Fish Town reef and these rocks is rather more than a mile wide, and the depth in it varies from 5½ to 8 fathoms. The bottom is generally of coarse brown sand, with several rocky patches.

Coley rock.—This rock lies 2¼ miles W. ½ S. from Cape shoal; it is a sharp pinnacle, on which the least water is 6 feet, with 10 fathoms to the eastward, and 13 fathoms close to its other sides. From this very dangerous rock the remarkable tree at Garraway bears N. ¼ E. distant 7½ miles; Kablah hill bears E. by N.; Rock Town point bears E. by S.; and cape Palmas E.S.E., distant 9½ miles. The ground between Coley rock and Cape shoal is very uneven, having several rocky heads with 4 to 5 or 6 fathoms over them and deeper water close around them; two other shoal spots will be found west of Coley rock, one of 6 fathoms at 3 cables distant, bearing W. by N. from the rock, and another of 5½ fathoms, known as Outer patch, bearing West, nearly 2 miles.

Current.—The current sets over Coley rock and in the vicinity with great strength.

Directions.—The quality of the bottom in the vicinity of these shoals is as variable as the depth, being of rock, coarse sand, gravel and coral. Vessels bound to cape Palmas with a leading wind, may safely pass inside Cape shoal, which is always distinguishable by its breakers; and by keeping in nearly mid-channel between it and Fish Town reef, there will be 7 fathoms water; at night it is advisable to pass outside of all, with cape Palmas light bearing E. ¾ S., or if the light be not seen, in 25 or 30 fathoms.

Middle point.—At Middle point, 1¾ miles eastward of Fish town, there is a rivulet and native town; a reef projects about a quarter of a mile W.S.W. from the point.

Rock Town point, where there is a large native settlement on each side of a small river, which is quite barred in the dry season, is 54 feet above the sea, and is situated 1½ miles south of Middle point; it makes very distinctly to vessels in the offing. A succession of reefs extends from the point, nearly a mile in a westerly direction, but inside them, there is a narrow 3½ fathoms channel.

Two single palm trees are situated close to the beach, distant respectively 1¾ and 2 miles from Rock Town point.[*]

Coast.—From Rock Town point a sandy beach of about 4 miles in length, and but little curved, extends to Palmas river. In this space there are two reefs which show themselves by heavy breakers. The outer is situated S.S.E. ½ E. from Rock Town point distant one mile, and rather more than half a mile off shore; the other reef is not quite a quarter of a mile off shore, and lies 1⅓ miles eastward of Rock Town point, with a narrow channel of 3½ fathoms inside it; between the two reefs there are 5¼ fathoms.

CAPE PALMAS.[†]—This cape is a rocky peninsula, joined to the main land by a low sandy isthmus; the highest part of the cape, near the middle, is elevated 74 feet above the sea. Its eastern extremity is covered by a number of native houses named Grand town, and on the remainder of the peninsula a settlement named Harper, was formed by the Colonization Society of Maryland in 1835. The white houses at Harper are conspicuous when seen from the eastward.

LIGHT.—A lighthouse stands on cape Palmas. From it is exhibited a *fixed* white light, seldom visible more than 2 or 3 miles; the light is not to be depended on, as it frequently goes out, and is not relighted during the night.

Palmas river.—This river falls into the sea on the northern side of the peninsula of cape Palmas; its entrance is about 100 yards wide, but several rocks lie in the channel. At low water, a general depth of 3 feet was found on the bar, inside of which, as far as the surveying boats went, the depth seldom exceeded a fathom.

The rollers on the bar are occasionally sufficiently heavy to prevent communication by ordinary boats.[‡]

Cape Palmas rocks.—In the direction of the length of the peninsula there are three groups of rocks lying off cape Palmas; the eastern of these, situated one cable from the cape, has 10 feet on it at low water; the middle rock is partially uncovered at low water, and lies two cables from the cape; and Outer rock, which is very small, and carries 9 feet water, lies about 5 cables west of the extremity of the cape. The soundings in the vicinity of these rocks are irregular, and the bottom foul; but on either side of the inner rock there are channels with 3 fathoms water; between the large middle rock and Outer rock there is a wide opening in which there is a depth of 4¼ fathoms. Strangers, however, should not use these passes, even when coming from the eastward and bound to Harper anchorage, but should keep outside all in not less than 14 fathoms.

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[*] Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

[†] *See* Admiralty plan:—Cape Palmas and Tabou river, No. 1,697; scale, *m* 1·0 inches.

[‡] Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1872.

Yoruba rock of 1¾ fathoms, on which the steam-vessel *Yoruba* struck in 1873, is situated W.N.W. from cape Palmas lighthouse, distant 4½ cables.

The wreck of the steam-vessel *Yoruba* (on the beach) bears N. 1½° E. from cape Palmas lighthouse, distant 7 cables.*

Reported dangers.—With reference to the reported existence of a sunken rock in the neighbourhood of cape Palmas, on which the British and African Steam Navigation Company's ship *Volta* was stated to have struck; also, of shoal ground (4¾ fathoms) reported by the steamship *Congo* in 1875.

The following account has been received from Lieutenant Hughes-Hallett, commanding H.M.S. *Firefly*, November 1879, the result of an exhaustive survey of the locality made with the boats of that vessel, which extended over a fortnight:—

The *Firefly* was at first anchored near the reported position of Congo rock, afterwards near that of Volta rock; from these positions close lines of soundings were taken by boats in all directions, but without finding the reported rocks, or any material difference from the depths shown on the Admiralty chart.

Having failed in finding the reported rocks or any trace of sunken dangers, by sounding, recourse was had to sweeping for them by a weighted line between two boats, but with a similar result.

From this examination and information obtained on the spot, it is considered that the dangers above-mentioned do not exist in or near the positions assigned them, and that the shoal ground reported was probably in the neighbourhood of Yoruba rock.

Buoys.—In April 1879 the following buoys were placed by the United States vessel-of-war *Ticonderoga* near shoals in the vicinity of cape Palmas† :—

A spar buoy painted red in 9 fathoms, with cape Palmas lighthouse bearing E. by N.; wreck on shore N.E.; and the west extreme of Russwurm island bearing East.

A red can buoy in 3 fathoms water near Yoruba rock, with the lighthouse bearing S.E. by E. ½ E.; wreck on shore N.E. ½ N.; and west extreme of Russwurm island S.E. by S.

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* H.M.S. *Firefly*, 1879.

† U.S. Hydrographic Notice, No, 37 of 1879, and Annonce Hydrographique, No. 95 of 1879.

Anchorage.—The usual anchorage is on the west side of cape Palmas, in 6 or 7 fathoms, on a line between Rock Town point and the lighthouse with the latter bearing S.E. ¼ E., distant 6 cables or farther out with the lighthouse bearing E.S.E. Steam vessels sometimes anchor nearer the cape in 5 fathoms, but have been obliged to shift out, on rollers setting in.

Russwurm island.—On the south side of cape Palmas a small rocky island, nearly covered with grass and shrubs, and formerly used by the natives as a depository for their dead, has been named Russwurm island, after the first governor of the American colony of Harper. The island is nearly 600 yards in length, with an average breadth of about 70 yards, and a rocky pinnacle on it rises 43 feet above the sea. A ledge of rocks extends 100 yards from its eastern extreme, and terminates in a large rock above water; at half a mile eastward of the island, and nearly a quarter of a mile from the shore, there are some breakers with 4½ fathoms close to their south side.

Three Foot rock.—At about 2 cables W. ¼ S. from the western extremity of Russwurm island, there is a dangerous rock with only 3 feet water on it, named Three Foot rock.

Boat passage.—The channel which separates Russwurm island from cape Palmas affords a good passage to boats, provided they keep on the northern side of it.

Flat mountain.—North-east of cape Palmas there is some elevated land, the highest part of which is named the flat mountain; it bears N. by E. ½ E. from the cape, distant 25 miles, and is 1,090 feet high.

Soundings.—The 100-fathom edge of the bank of soundings approaches cape Palmas within 13 miles, the depth decreasing to 30 fathoms at a distance of 6 miles from the shore; and at 1½ miles from the cape the depth is 15 fathoms.

Tides.—It is high water, full and change, at cape Palmas at 4 h. 30 m.; springs rise 4 feet.

Currents.—The currents along the coast between Sierre Leone and cape Palmas during the rainy season, are influenced entirely by the wind. When the breeze is fresh, a current of at least 2 miles an hour may be expected; if the wind is south of S.W., the direction will be N.W.; if to the west of S.W., an easterly or S.E. current running strongly may almost be depended upon; and with a fresh S.W. breeze in August, a set of 1½ miles an hour has been experienced. During the month of November the set appears to be strong and generally to the N.W. From the middle of December to May the current may be expected to be found running to the S.E., at the rate of one mile an hour nearly.

During the rainy season, at the distance of a few miles from the shore at cape Palmas, an easterly set of 3 knots an hour has been experienced.

CHAPTER X.

CAPE PALMAS TO CAPE THREE POINTS.

IVORY COAST.

VARIATION in 1880.

Grand Bassam - - 19° 20′ W.

Lagoon.*—A narrow stagnant lagoon, extends for 6 miles to the eastward of cape Palmas. It appears to be supplied by a small river, which, except in the rainy season, has not power to break through the sandy barrier that separates it from the sea. The position of this occasional outlet is marked by a depression of the beach; and on each side of it there is a native village, the inhabitants of which, it is said, sometimes empty the lagoon by an artificial channel, in order to take the fish.

Athol rock.—The beach eastward of cape Palmas is steep-to, with one or two conspicuous masses of stone upon it. A rock, with 3 fathoms on it, bears S.E. ¼ E. from the lighthouse on the cape distant nearly 2 miles. In the same direction, but one mile farther off, there is a rock with 5 fathoms on it; and S.E. ¼ S. distant 4¼ miles from the lighthouse, in the stream of 12 fathoms, the shoal lies on which H.M.S. *Athol* struck in 1830, its distance from the nearest shore being 2 miles, with cape Palmas lighthouse bearing N.W. ¼ N., and Growa point bearing East. The depth on Athol rock is 3¼ fathoms.

Growa reefs.—The space between cape Palmas and Growa point, a distance of 7 miles in an S.E. by E. ½ E. direction, is full of rocky heads, of too great a depth to bring a vessel up, except the three above described; a long series of reefs project nearly 2 miles to the westward from Growa point. The sea breaks violently on these reefs, which are steep-to, and towards which no vessel should approach at night nearer than 15 fathoms. There are two native villages near the point.

Cavally point.—At 1½ miles eastward of Growa, Cavally point forms the southern extremity of this part of Africa. The point, which may be distinguished from the adjacent sandy shore, by its black rocky appearance, is surrounded by reefs, extending half a mile to seaward. The village of Half Cavally stands on the point, and three other villages a little to the eastward.

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* *See* Admiralty plan.—Cape Palmas and Tabou river, No. 1,697; scale, $m = 1{\cdot}0$ inches; and Admiralty chart.—Africa, West coast, Sheet XI. Cape Palmas to Grand Lahou, No. 1,362

Cavally rocks.—Eastward from Cavally point, distant 1½ miles, there is a large rock above water, which rises from a reef lying about a quarter of a mile from the beach; and at a mile farther east there is another ledge, about half a mile from the shore, with another large rock above water upon it. Sunken reefs lie close along the coast abreast of this ledge, and between them there is a narrow channel, in which there is a depth of 5½ fathoms.

Cavally ledge.—Between Cavally point and Cavally river there is a large and dangerous ledge, the southern extreme of which rises suddenly from the depth of 10 fathoms, and extends from thence towards the river. From that outer extreme Cavally point bears N.W. by W. ½ W. distant about 2 miles, and the mouth of Cavally river E.N.E. about the same distance.

Cavally river* issues between two low and sandy points, 4 miles eastward of Cavally point, it has a bar at the entrance, which is not always passable by boats. On the western entrance point there is a large native town, which may be recognised by its square church tower and several large trees, and on the eastern entrance point there is a group of tall palm trees. At a short distance seaward of the bar, there are some detached rocks, with 4½ fathoms close to the southward.

Landing.—There is good landing inside the reef abreast the town, but the boat must be hauled up quickly to avoid being filled.

Cavally islet.—At about 3 miles eastward of Cavally river there is a small rocky islet situated half a mile off shore, with a long reef extending from it in a W.S.W. direction; from the west extreme of this reef to the beach, the space is filled with a succession of breakers and ledges of rocks.

Anchorage.—There is anchorage in 7 fathoms, midway between Cavally point and Cavally ledge.

Coast.—From Cavally islet to Tafou point, the coast trends 8 miles in an easterly direction, the shore being formed by a sandy beach, off which lie a few rocks, and along which are several villages, conveying the idea of there being a numerous population. The interior appears to be one dense continuous forest, rising occasionally into clumps, either from undulations in the ground or from the character of the trees. Some of these clumps attain the height of nearly 200 feet above the sea.

Tabou river.†—Tafou point, lying 8 miles east of Cavally islet, may be easily distinguished by four tall palm trees; it is a small bold cliff, with 3 fathoms close to its base. A small river, named Tabou, after expanding into a lagoon, issues, at 250 yards eastward of the point, through a narrow channel, not more than 55 yards in breadth. Between Willson point, the west entrance point, and Tafou point a reef of sand and rocks, some of which are dry, extends to the south-eastward; on the bar between this reef and William point, the east entrance point of Tabou river, there is a depth of 3 feet at low water. This shallow channel lies along the eastern shore, till a spit of sand which projects from Willson point, and is nearly awash, is rounded, and even then the water scarcely deepens for a mile within the entrance; nevertheless this little river is a convenient place for wooding and watering, being easy of access to ordinary boats, as the bar is generally smooth, and there is good anchorage in 7 fathoms within a quarter of a mile of its mouth.

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* Navigating lieutenant W. H. Turner, H.M.S. *Spiteful*, 1870.

† *See* Admiralty plan.—Tabou river, No. 1,697; scale, $m = 1{\cdot}0$ inches.

Water.—At the last of the ebb tide, good fresh water may be obtained in any part of Tabou river; but it is more prudent to procure it about half a mile within the entrance, abreast of a small detached sandbank, where the boats may anchor in the middle of stream, and fill their casks alongside.

Supplies.—To obtain wood it is necessary to obtain the consent of the neighbouring chiefs, who style themselves respectively the River King and the Hill King. The former possesses two open towns at the entrance of the river; while the dominion of the latter is confined to a single village, but it stands on a rising ground about half a mile to the eastward, and was well stockaded. They are at first very unreasonable in their demands, but a little patience and a few presents will generally procure their consent; and then, besides being unmolested while watering, some small cattle, sheep, goats, and fowls, with bananas, sweet potatoes, cassada, pumpkins, and rice may be procured in exchange for old clothes, tobacco, biscuit, and empty wine-bottles, which latter are always in great request. Coloured cloth and most manufactured articles fetch their full value all along this coast, and are equally coveted, both by the kings and their subjects; but above all other things, rifles, powder, and spirits are the great objects for which they contend.

Rocks.—Some rocks above water and sunken dangers lie eastward of William point, and also off James point the next to the eastward. Off the Hill King's village there is also a small reef; all these dangers have 2½ fathoms close to their southern edges. The most dangerous of them lies a quarter of a mile S. ½ E. from Hill King point; it carries but 3 feet water, with 3 fathoms close around it.

Tides.—It is high water, full and change, in Tabou river at 4 h. 45 m.; spring rise from 3 to 4 feet.

Tabou point.—From Tafou point the coast trends about E. ½ N. for a distance of nearly 3 miles to Tabou point, that is low and foul;

and S. ½ W. from which at three quarters of a mile distance, there is a rock with 2½ fathoms on it, steep-to with 9 fathoms outside it. Tabou point is double, with a village on each of its projections, and close round it to the northward, is situated a river barred at the entrance, but open probably during the rainy season.

Grand Tabou.—At one mile north-east of Tabou point there is a large native village named Grand Tabou, with an isolated reef in front of it, situated about a quarter of a mile from the shore.

Anchorage.—Vessels anchor off Grand Tabou for trading purposes; the natives are treacherous and should be guarded against.

Basha point.—The bight between Tabou and Basha points, except at the above-mentioned reef, is clean, with regular soundings, and a sandy beach; Basha point is capped with rock, and the town upon it stands 50 feet above the sea.

A chain of reefs commences at half a mile westward of the point, and continues for a distance of 1¾ miles to the north-eastward. They extend more than half a mile off shore, and lie in detached groups, steep-to on the outside, with a boat channel between them and the beach; this part of the coast should be approached with great care, for in 1853 H.M.S. *Penelope* struck when 2 miles off shore, with Basha point bearing W. by N. distant 2 miles.

Basha point may be known by a large flat-topped tree at the town; and also by a grove, which stands about 340 feet above the sea, on a rising ground N. by E. ½ E. distant 5 miles from the point.

Doo Enoon hill, 15 miles distant in nearly the same direction, is likewise a conspicuous object.

Grand Basha river.—At about a mile eastward of Basha point, is situated the entrance to Grand Basha river, which like most of the rivers on this part of the coast, forms a junction with another stream just at the shore. There is a bar before it, and also two reefs a short distance outside the bar, with a narrow boat channel between them.

Wappoo point.—From Grand Basha river a broad and nearly straight beach extends 3½ miles to Wappoo point, a small rocky cliff on which a native town stands about 60 or 70 feet above the sea; it is quite safe to approach and bold on its southern face; but to the eastward there are some off-lying rocks along the shore for the distance of a mile, none of which extend more than 300 yards from the coast. At Wappoo there is a large tree similar to that at Basha; and at a distance of one mile N. ¾ W. from the tree there is a grove, the top of which is about 353 feet above the sea.

There is no permanent opening through the beach at Wappoo, but a large body of water that accumulates there, sometimes issues just to the westward of the cliff. This water is connected with a long and narrow lagoon, which lies close behind the beach, and reaches to the river Poor, a distance of 9 miles. The sandy barrier that separates this lagoon from the sea is covered with trees, but occasional bare spots show where the swelling waters burst through in the rainy season.

Poor point is situated on the western side of Poor river; it is low and rocky, and some rocks extend from it to the eastward about a quarter of a mile, in front of the entrance to the river, which is very narrow, but not entirely closed. These rocks, many of which are above water, are steep-to, having 4 fathoms close to them to seaward.

Coast.—From Poor river to the rocky bluff of Kadahboo, the distance is 10 miles in an E. by N. ½ N. direction. The coast between consists of a succession of sandy bights divided by rocky points, and the whole country appears a vast forest, rising gradually into dark wooded hills, one of which, named Bereby coppice, lying N. ¾ W., distant 2½ miles from Poor point, is 300 feet above the sea.

Round mountain, bearing N. by W. ¼ W. distant 11½ miles from Poor point, and Long mountain, bearing N. ½ E. distant 8 miles from the same point, are of moderate elevation, but afford good landmarks when in the offing.

Half Bereby.—The native town of Half Bereby stands upon the second point east of Poor river; the numerous villages near the shore appear to be thickly peopled, but traders should guard against the treachery of the natives. At 3 miles east from Poor river, commences an extensive line of reef lying parallel to the coast for a distance of 4½ miles, and terminating rather more than half a mile south-west of Divile rock. The average breadth of this chain of reefs is about a mile, and there is a safe passage for boats between it and the shore, with regular soundings from 1½ to 4½ fathoms. This whole chain is steep-to on the outer side, there being 6 fathoms within a few yards of it, and farther out there are no dangers, the soundings decreasing regularly from a depth of 30 fathoms, which is found at 5 miles in the offing.

Divile rock is a large oval rock, rising 45 feet above the sea; the base is dark, but the numerous sea-fowl of which it is the constant resort, have blanched its flat summit. It lies about 2½ miles W.S.W. of Kadahboo bluff, and two-thirds of a mile from the nearest shore. On the bearing of E.N.E. from it, distant a third of a mile, there is a sunken rock, upon which the sea breaks. These rocks are both steep-to on the south side, having 6 fathoms close to them, and there is a channel of 4 to 5½ fathoms in depth between them and the shore.

Kadahboo bluff is a bold rocky point, the south-east extreme of which is cleared of trees, and the bare summit, on which stands the native town of Yeh, is 120 feet above the level of the sea.

Grand Bereby.—From Kadahboo bluff, the shore makes a sudden turn to the northward, for about a mile, to the mouth of Nahno river; and on a rising ground in the space between stands Grand Bereby town, abreast of which, and a quarter of a mile off shore, there are some rocks, named Goomarah reef, with a boat channel between them and the beach.

Nahno river.—This river pours out a small volume of water, but its sheltered position enables it to wash away the bar at its entrance, so as to be always open for boats; there are some rocks immediately off its mouth, with 2 fathoms inside them. There are several hills by which this place may be recognised from the offing; two standing together, named the Sisters, lie 3 miles N.W. of Kadahboo bluff; Acol, a sharp-pointed hill, is situated N.N.E. distant 5 miles from the bluff; and at a distance of 16 miles in the same direction, the Oval mountain rises 1,315 feet above the sea. When near the shore the place may be known by the sudden receding of the coast line and the peculiar form of Kadahboo bluff, as well as by Katum rock, a large white rock, which lies 1¼ miles E.N.E. from Kadahboo bluff.

Tahou point.—From Grand Bereby a long sandy beach trending about E. by S. extends 13 miles to Tahou point, which is rocky and steep to, with 4 fathoms close to it. The numerous native settlements along this part of the shore are named generally the Villages of Tahou. The coast is thickly wooded and of moderate elevation, the tops of the highest trees near Tahou point being 290 feet above the sea.

Eastward of Tahou point the shore changes its character, isolated and irregular hills rising immediately over the beach.

Rocks.—In this extent of coast there are many rocks, both above and under water; the first group is situated 1½ miles eastward of the large white rock of Katum; it is about 2 miles in length, and extends three-quarters of a mile from the shore; at 5¾ miles east from Katum rock and 1¼ miles from the shore, there is a large white rock with 9 fathoms round it, to which the natives have given the name of the Brooni, or White man; some breakers lie rather more than half a mile W.S.W. from Brooni rock, in the stream of 10 fathoms; and abreast of it, near the shore, there is a group of rocks above water, with a channel of 3½ fathoms between them and the beach.

A rocky ledge, with 5½ fathoms on it, lies E. ½ S. distant 2 miles from Brooni rock, in the stream of 10 fathoms; midway between that ledge and Tahou point, and at about half a mile from the beach, there is a sunken rock, inside of which there is a channel of 5 fathoms; at a mile farther to the eastward, there is another shoal, nearly in the meridian of a high grove of trees; and just westward of Tahou point a series of rocks commences which nearly surrounds the point, and in one place extend from it nearly a mile.

Some of them are large masses of dark stone above water, and a narrow channel may be found through them with 3½ fathoms water in it. All these rocks are steep-to on the southern side.

San Pedro river, situated 3 miles eastward of Tahou point, appears to be a large sheet of water with a small islet in its centre, but during the Admiralty survey in 1838 the entrance was entirely barred by a broad bank of sand.

San Pedro point, surmounted by hills 350 feet high, is situated on the east side of San Pedro river.

Highland river is a fine open stream issuing from behind Highland point, 6 miles east from Tahou point, and into which the surveying boats easily entered by a channel carrying 6 feet at low water.

The tidal streams in Highland river are very rapid.

San Pedro shoals.—From Tahou point to Highland point the shore is fringed by a succession of rocks and breakers, named the shoals of San Pedro; they are all steep-to on the outer face, do not project more than half a mile from the coast, and leave a safe 3-fathoms channel for boats between them and the beach.

Highland point, which by its shelter leaves the bar of Highland river generally passable, is a bold rocky peninsula, but has some rocks extending a short distance off it; it forms the south entrance point of Highland river. A rocky hill rises immediately inland from the isthmus, which connects Highland point to the main, to the height of 350 feet. A small river lies to the westward of the point.

Drewin point lies 11 miles eastward of Highland river, and in the space between there are a few indentations in the coast, and but two dangers. A short reef lies about a mile westward of Ensou point, which is situated midway between San Pedro river and Little Drewin; and Temple rocks, are situated 3½ miles eastward of that point. The latter lie about a quarter of a mile from the coast in front of a village, with a clear 3-fathoms channel between them and the shore. The approach from the offing is everywhere safe, with regular soundings. The land here gradually attains a little higher elevation, and is more diversified with hill and dale than the coast to the westward. The hill named East tree is 400 feet above the sea; Temple hill, 520 feet; and the whole range, which extends 27 miles along the coast to St. Andrew river, has received the name of the Highland of Drewin.

Little Drewin.—On the north side of Drewin point there is a small bay, with the two villages of Little Drewin situated at the base of the hills. The Kroomen name the inhabitants "The Saucy Drewins," from their rough and noisy habits.

Abrapa cliffs.—From this bay a succession of small rocky points, with slightly receding sandy beaches between them, extends in a straight line E. ½ S., for a distance of 6 miles to the white cliff of Abrapa, off which there are a few rocks. In the space between, there are also three small streams, but all barred across their mouths.

Enframa point.—From Abrapa cliffs to Enframa point, a distance of 7 miles in an easterly direction, the coast continues of a similar character; several rocks show themselves by breakers, but they are generally very near the shore, and all have 6-fathoms close to. The most prominent of these lies 3 miles eastward of Abrapa point, and nearly half a mile off shore, with a 4-fathoms channel between it and the coast. There is a conspicuous white cliff with some reefs at its base, nearly half-way between Abrapa and Enframa points, off which latter a reef extends about a quarter of a mile.

Cassi point lies 4 miles eastward of Enframa point; in the bay between there is a small river barred in the dry season, and to the eastward of the river a large village named Grand Drewin.

Grand Drewin.—From Cassi point to Swarton corner, a distance of 7 miles in an E. ½ N. direction, the coast still retains its character of sandy bays and rocky points, fronted by small reefs, and with elevated land in the interior intersected by valleys. The town of Grand Drewin lies 1½ miles eastward of Cassi point, and off the town there is a detached rock, about half a mile from the shore. Midway between this rock and Swarton corner there is a reef with two breaking shoals outside of it, lying a mile from the shore; from thence to Swarton corner the coast is clear of all danger.

Swarton corner is a bold headland, 210 feet above the sea, forming the eastern extremity of the high land of Drewin; some fragments of rocks are scattered round its base, but there are 5 fathoms close to them.

Sassandra or St. Andrew river.—King George town stands on the shore about half a mile north of Swarton corner, and at the head of the little sandy bay eastward of that headland, the rivers St. Andrew or Sassandra and Tabeta pour their united waters into the sea. The two long sandy spits between which lies the opening, are probably submerged during the rainy season; and then, a large rock 8 feet high, which stands on the extremity of the western spit, will appear like an islet in the middle of the entrance. On the bar which extended across this opening the surf was so heavy that no boats could enter, and therefore the depth of the spacious sheet of water inside is imperfectly known, but a few soundings obtained from a canoe, showed that in parts of it there were from 5 to 7 fathoms. Besides the rivers above mentioned there are two smaller streams which fall into the bay, the Beyh and the Gapeh ; and opposite the mouth of the latter there is a small island named by the natives Nuckbah.

Sassandra hills.—On the bearing of N.W. by N. from Swarton corner there is some elevated land, at 5 or 6 miles distance ; and there is a range of still higher ground, named the hills of Sassandra, the extremes of which bear from N.N.W. ¾ W. to N. by E. from Swarton corner, distant 15 miles ; the highest part of this range is 930 feet above the sea.

Anchorage.—Trading vessels anchor off St. Andrew river, and with the aid of a native pilot the river can be entered in boats.

Soundings.—The bank of soundings to the 100-fathoms line extends 18 miles south from Swarton corner, the 30-fathoms line approaching to within 10 miles.

Price point.—Eastward of St. Andrew river a flat coast and sandy beach extends for 3¼ miles to Price point, at which hills again rise, those immediately about the point attaining an elevation of 275 feet.

This sandy beach is steep-to and quite clear of rocks ; but Price point and Trepow point, situated 1¼ miles farther east, are both rocky, and have a few off-lying rocks at their bases ; there are two small bays between these points, and at the base of the hills near the shore there are numerous villages. The soundings decrease more slowly in approaching the shore here, than to the westward of St. Andrew river, and the bottom is everywhere of mud.

Mortality point, lying 2 miles eastward of Trepow point, projects but little from the line of coast, it is bold and without any detached rocks ; the vicinity is populous.

Mount Langdon.—From Mortality point to Mount Langdon, a distance of 5½ miles, the shore continues high and broken by ravines, through which run large streams. A few rocks lie near the shore in this space ; the bank of soundings off the coast is rather flat, there being 3 fathoms close in, and only 7 fathoms at 1¼ miles in the offing. Mount Langdon is 355 feet above the sea ; a short reef extends about a quarter of a mile from its base, and on either side there is a barred-up river. The beach is sandy, with occasional bare patches of rock upon it.

Yawodah cliff.—At Yawodah, situated 3 miles eastward of mount Langdon, a series of red cliffs begins, and extends to Fresco river, a distance of nearly 15 miles. From Yawodah to the red cliffs of Kootrou the coast is nearly straight for a distance of 4 miles ; the land continues high, much broken, and to all appearance thinly peopled. The beach is sandy and entirely clear of rocks ; at Kootrou the cliffs are about 150 feet above the sea, while the tops of the trees on the adjacent hills rise to a height of 270 feet.

Mount Bedford.—The coast continues nearly straight for 9 miles in an E. by S. direction from Kootrou to mount Bedford, which stands over the largest and most remarkable of the red cliffs, at an elevation of 240 feet above the sea ; the shore is generally a sandy beach, though under some of the cliffs the beach disappears, and large stones, apparently débris from the falling of the cliffs, from the coast line. Throughout this space the shore is fronted by rocks, which extend a quarter of a mile from it ; but a vessel may stand into 5 fathoms without danger, and in that depth will generally be about half a mile from the beach.

Fresco river.—The red cliff at mount Bedford is 1½ miles in length, and its eastern extremity descends gradually to Fresco river. The mouths of this river are barred in the dry season, but the natives state that they open in May. The delta extends 1½ miles from west to east, and is divided into several wooded islets. On the sandy point to the eastward of the river stands a large native town named Fresco ; and the main body of water is evidently discharged at that point. A range of high land named the hills of Fresco, are situated 5 or 6 miles N.N.E. of the town.

Coast.—The coast between Fresco river and the river of Grand Lahou, for a distance of 35 miles in an E. by S. ¼ S. direction, is low, well wooded, and thinly inhabited. The beach is everywhere a clean light-brown, sand, free from off-lying rocks ; it is nearly straight, and the surf on it is always very high. Within this beach there is a narrow strip of stagnant water, which lies parallel to the coast throughout the whole distance between the two rivers, and in a few places appears to receive some small streams from the interior. Natives villages are built at intervals upon the narrow belt of land between this backwater and the ocean, they are generally surrounded by groves of cocoa-nut trees.

Soundings.—The soundings along this whole extent of coast are regular, there being a depth of 3 fathoms close outside the surf, deepening gradually to 10 fathoms at a mile from the beach. Near the coast the bottom is generally sandy, changing gradually to mud, which is found in the offing.

Piccaninny Lahou.—This town is situated 14 miles eastward of Fresco river. Some rising ground behind it is known as the Cacrabah or Small hills.

Half Lahou lies 15 miles east of Piccaninny Lahou, and Salt town 2 miles farther in the same direction, or within 4 miles of Grand Lahou river.

Grand Lahou.*—The town of Grand Lahou is upwards of a mile in length, and stands on the western point of the entrance of the river of the same name. This entrance is very narrow, with a dangerous bar across it, on which the sea breaks with so much violence, that it is not passable by ordinary boats, and even the native canoes are frequently upset upon it. Both points of the river are low and sandy; the western entrance point is covered with cocoa-nut trees, under which the town is built; on the eastern point there is another smaller town, but no trees. The two towns contain a numerous population.

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* *See* Admiralty chart.—Africa, West coast, Sheet XII., Grand Lahou to cape Three points, No. 1,364.

Mount Lahou, a short range of hills 350 feet high and covered with large trees, stands about 6 miles N.N.E. of the entrance to Lahou river.

Long hills.—At about 5 miles eastward of mount Lahou the Long hills commence; they lie parallel to the coast for 11 miles, and are of about the same height as mount Lahou.

Tides.—It is high water, full and change, at Grand Lahou at 4h. 20m.; springs rise 4 feet.

Coast.—From Grand Lahou a high sandy beach continues in a straight line E. by S. ¼ S., for a distance of 60 miles to Piccaninny Bassam; and a narrow lagoon or backwater extends the whole distance, at an average distance of about 2 miles from the shore. The land is everywhere low without any remarkable object upon it; and the ridge of sand between the lagoon and the sea, being thickly wooded, presents the same uniform appearance throughout, varied only by the numerous villages upon it, round each of which there is a grove of cocoa-nut trees. The beach is everywhere steep-to, 3½ and 4 fathoms being found as close to the surf as it is prudent to venture. Off Grand Lahou there are 10 fathoms at a mile from the shore; off Jack-Jack the same depth at three-quarters of a mile; and off Piccaninny Bassam there are 17 fathoms close to the beach. The tops of the trees in the foreground are from 120 to 140 feet above the sea, but near Jack-Jack they rise to a height of 190 feet.

Amoqua or Half Jack.—This town, apparently of considerable size, lies 32 miles eastward of Grand Lahou. The only marks for recognising this place are a white hut with two flagstaves on the beach, and a third flagstaff among the trees. Good water can be obtained here in large quantities.

The natives on the coast between Half Jack and Grand Lahou are said to be very troublesome, having in some cases boarded and taken complete charge of merchant vessels.*

Afougou or Ivory Town is a native village situated 37 miles eastward of Grand Lahou, off which trading vessels anchor, and which is the best place at which to obtain water between St. Andrew river and Axim.

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* Navigating sub-lieutenant C. E. Pritchard, H.M.S. *Ariel*, 1876.

Piccaninny Bassam is a native village built on a narrow strip of sand about 500 yards wide, which separates the lagoon from the sea.

Bottomless pit.—Near Piccaninny Bassam, in long. 3° 57′ W., is situated an extraordinary feature of this coast, known as the Bottomless pit. The great bank of soundings which fronts the west coast of Africa, and which extends to various distances from the shore, and therefore falls with various degrees of declivity, but even when steepest, generally preserves a regular descent, is at this point divided into two parts, by a narrow ravine or gully of very great depth. East and West of this place the 100-fathom line is approximately 14 or 15 miles from the land, but here it turns in gradually towards the coast in a funnel shape. At 8 miles off shore the two lines of 100 fathoms are 3 miles apart, with no bottom at a depth of 200 fathoms between them; at 3 miles from the coast they approach each other within less than a mile, with a depth of 256 fathoms in the channel between. At a mile from the shore the gully is scarcely a quarter of a mile wide; at a third of a mile there is still a depth of 100 fathoms; and finally, at the head of this singular submarine valley, there are 20 fathoms water at the very edge of the beach. The bottom is generally a soft bluish mud, but at the depths of 190 and 220 fathoms some coral rock was brought up by the lead.

The land continues very low for some distance in-shore, with two ranges of hills to the eastward and westward.

There were no eddies nor ebullition observed in the sea, and while at anchor in 18 fathoms, three-quarters of a mile off the eastern village of Piccaninny Bassam, no tidal stream was experienced, nor any discolouration of the water observed.

Ordinary boats could not effect a landing, and the natives were several times upset in bringing off fowls, pigs, kids, yams, plantains, and limes.

GRAND BASSAM.*—From Piccaninny Bassam the coast trends S.E. by E. for a distance of 15 miles to the mouth of Costa river, on the western side of which, at 5 miles within the entrance, are situated the several villages of Grand Bassam. Three French factories are established on the western side of Costa river, immediately within the mouth. The entrance to the river is between two low sandy points, on the eastern of which there is a clump of trees; it is very narrow, and there is a heavy surf upon the bar, which carries a depth of 12 feet at high-water springs; vessels however, of more than 7 feet draught should not attempt to cross it except under favourable circumstances. A pilot can be obtained from the French factories.†

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* *See* Admiralty chart.—Grand Bassam to cape St. Paul, No. 2,772.

† Navigating sub-lieutenant C. E. Pritchard, H.M.S. *Ariel*, 1876.

The bar is generally passable for about two-thirds of the year.

Anchorage in 8 to 10 fathoms can be obtained either east or west of the mouth of Costa river.

Several small steam vessels, belonging to the French navy, are stationed at Grand Bassam.

The constant discharge from Costa river discolours the sea for a distance of 4 or 5 miles from the shore.

LAGOONS.—An extensive chain of inland lagoons is situated between Lahou and Assini rivers ; their only outlet is through Costa river. The shores of these lagoons are densely peopled and there is a considerable trade in palm oil.

Three streams pour their waters into these lagoons, the principal being the Akba or Comoë.

Numerous trading posts are established round the shores of these inland waters, and several small steam vessels ply on them for trading purposes.

Akba or Comoë river.—At about 3 miles N.N.E. of the French factories at Grand Bassam this river joins the lagoon on the eastern side ; the course of Comoë river has not been explored beyond about 30 miles from its mouth, but it is said to come from a long distance in the interior.

Between April and June the river rises about 15 or 20 feet.

At Alepé, 20 miles above the mouth of the river, are situated some rapids which are, however, passable by small steam vessels.

Comoë river is connected on its eastern side with two shallow lagoons, known as Ono and Kodisbouē lagoons, which latter extends almost to Assini river.

The downward current of Comoë river is very rapid and dangerous to small vessels lying at the anchorage north of the French factories at Costa river.

Potou lagoon, extending northward for about 12 miles from Grand Bassam, is narrow and shoal, but navigable for small steam vessels.

Grand Bassam lagoon extends about 65 miles west of Grand Bassam, at an average distance from the coast of about 2½ miles, its western part is only 3 miles from Lahou river.

The lagoon contains many small islands, and the shores are much indented and densely populated.

At Dabou, on the northern side, about 40 miles W.N.W. of Grand Bassam, is situated a fortified French post.

At about 4 miles east of Dabou the lagoon receives the waters of Aéb river, which flows into it from a northerly direction; this river, the Comoë and a stream at the head of the lagoon, are the only three which are known to communicate with it.

Grand Bassam lagoon is navigable only for vessels drawing 6 feet; an extensive shoal, on which that depth is found, lies about 8 or 10 miles east of Dabou.

Assini river.—This river, the bar of which is frequently impassable, even for canoes, except during the harmattan season, lies 19 miles east of Costa river; the intermediate beach is nearly straight, with several villages upon it. The coast is free from off-lying rocks, and the soundings are regular up to the depth of 5 fathoms, which is found close to the surf, that commonly runs so high as to render landing impracticable. Near the shore the bottom is generally of fine dark sand, but outside of the depth of 10 fathoms a dark olive mud.

The entrance to this river can only be distinguished from seaward, by the surf breaking further off-shore than it does in the vicinity.

In very fine weather small steam vessels drawing 4 feet can cross the bar, at 9 miles within which, on the west side of the river, there is a fortified French post.

A large village is situated close west of the entrance to Assini river.*

Lagoons.—An extensive sheet of water, covering a space of about 35 miles east and west, by 20 miles north and south, communicates with Assini river; the various divisions of these inland waters are known as Aby, Tendo, and Eyhi lagoons.

Several streams fall into these lagoons, the principal being the Tanoe or Tendo, which enters Eyhi lagoon from a northerly direction.

Sueiro da Costa hills, which lie to the westward of Assini river, and 6 or 7 miles inland, rise towards the north-eastward, where Church mount is 540 feet above the sea.

Assini.—This town lies about 9 miles east of the entrance to Assini river, and consists of several European buildings, with a native village close west of them.†

Half Assini or Albanee, a village with about 1,000 inhabitants, lies 32 miles east of Assini river.‡

Albanee river.—From Assini river a sandy beach extends S.E. by E. ¼ E. for a distance of 38 miles, and nearly in a straight line to Albanee river. Between these two rivers a narrow lagoon extends parallel to the beach at a distance of about a mile from it, and appears to have forced through the sandy beach four communications with the sea, which are not connected with any corresponding streams from the interior.

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* Navigating sub-lieutenant R. W. Gore, H.M.S. *Bittern*, 1873.

† Navigating lieutenant C. D. Clark, H.M.S. *Boxer*, 1877.

‡ Navigating lieutenant W. E. Scriven, H.M.S *Druid*, 1872.

Assini hills.—There is an undulating range of high land along this coast, which may be divided into the Assini, the Albanee, and the Apollonia hills. The western extremity of the former is known as the "Grotto," and stands about 470 feet above the sea.

Albanee hills.—The western extremity of Albanee hills is 340 feet high, but they rise a little towards the eastern part of the ridge, where it overhangs Albanee river.

Apollonia hummocks.—To the eastward of Albanee river are situated the four hills or hummocks of Apollonia, or, as they are usually named cape Apollonia ; for, lying at an angle of inclination with the coast, and terminating upon the beach, with an extensive level plain to the eastward, they present, when seen from a distance, all the appearance of a long projecting point. The highest of these hummocks is about 325 feet above the sea.

Between Assini river and Apollonia the whole country is covered with a dense forest, and apparently but thinly peopled to the westward of Albanee, but from that town to Apollonia the coast is studded with villages.

Coast.—From the hummocks of Apollonia to Ancobra river, a distance of 23 miles, the land presents the appearance of an extensive plain, covered with forest. A high sandy beach, nearly straight, forms the coast line, and at a few yards from the shore, in the midst of palm-groves, are situated many native villages. The soundings are everywhere regular, with no rocks or shoals, and the quality of the bottom is fine dark sand near the shore, with dark olive-coloured mud in the offing.

Apollonia fort.—This fort (which is the first seen eastward of Sierra Leone) stands on the beach about 4 miles east from Apollonia hummocks. It was originally one of those strong trading houses where goods were deposited, and where the merchants resided, but which, from the attacks of rival traders, native robbers, and sea pirates, were gradually converted into military defences ; it is now in ruins.

Abmousso river.—A straight and safe coast extends for 12 miles from fort Apollonia to Abmousso river, the entrance of which is very narrow, with a high surf breaking across it.

Ancobra river.*—This straight sandy beach extends only 7 miles east of Abmousso river, Ancobra river there dividing it from the group of hills and rough ground which form cape Three Points, and the whole aspect of the coast is at once changed. Ancobra river winds round the foot of the hills from a great distance inland, and pours out a considerable volume of water through an opening 300 yards wide, but so obstructed by large stones and rocks, that even canoes cannot venture out except in the most tranquil state of the surf.

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* There is said to be a depth of 6 feet water on the bar of this river at low water, and it is navigable by small vessels for a considerable distance inland.—*Journal of Royal Geographical Society*, 1878.

Acrumassi point, which forms the east side of the entrance to Ancobra river, has a ridge of black rocks and loose stones extending S.S.W. from it about a quarter of a mile; at half a mile S.W. ¾ W. from the point there is a detached ledge of rocks (Acrumassi ledge), some above and others under water, with a channel of 3½ fathoms between them and Acrumassi point; and W. by N. distant one mile from the same point, there is a solitary breaker.

AXIM BAY.*—From Acrumassi point to Pepré point (a low point with a few trees upon it), the distance is nearly 3 miles in a S. by E. direction, and the coast between recedes into what is usually known as Axim bay, the well-known fort of St. Anthony standing about a mile northward of Pepré point; it is situated on a low rocky point, with a sandy bay and native town on either side,† and some rocky ledges in front. The top of the highest building is 75 feet above the sea, and the hills about two-thirds of a mile to the eastward are 300 feet high. The landing here is safe, being protected from the heavy swell by the rocky ledges and islets which lie in the vicinity.

Saiaba island.—This island, which lies 9 cables N.W. by N. from Axim fort, and half a mile north-west of Ronda point, with which it is partly connected by a chain of rocks, between which there are deep passages for boats, is 45 feet in height; a large flat rock, nearly awash, is situated half a cable south-west of Saiaba island. A ledge of rocks projects from Quebrada point, at a quarter of a mile north of the fort, for a distance of about a cable, and two large groups of rocks which lie immediately in front of the fort, afford protection and shelter to the adjacent beach. Giba and Bobowassi islands are situated south-west of the fort, and between them and the shore, as far as Pepré point, the space is nearly filled by rocks and ledges; Bobowassi island has a clump of palm trees on its summit. These islets and ledges are all steep-to on the western side, having 4 fathoms close to them.

Hoeven rock, with 12 feet over it and 5 fathoms close to, is the principal danger in Axim bay. From this rock, the south-west extreme of Bobowassi island bears S.E. distant 5½ cables, and the summit of Saiaba island bears N.N.E. distant 7½ cables.

Anchorage.—To avoid Hoeven rock, bring St. Anthony fort to the northward of E. by N., when a vessel may anchor in safety in 6 fathoms.

A good birth is found with Saiaba island summit bearing N.N.E. and St. Anthony fort bearing E.N E.

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* *See* Admiralty plan.—Axim bay, No. 1,713; scale, *m* = 2 inches.

† These towns were destroyed during the Ashanti war of 1873.

Water may be purchased at Axim in small quantities. The watering place is a well behind the fort, but the water is not of good quality.

Tides.—It is high water full and change in Axim bay at 4h. 30m.; springs rise 4 feet.

Soundings.—The change in the character of the coast which occurs east of Ancobra river makes none in the regularity of the soundings, the bank to the 100 fathom line off Axim bay being about 20 miles in breadth, and the bottom of fine sand, the depths diminishing gradually from 100 fathoms to 3 or 4 fathoms near the surf.

Peninsula point.—From Pepré point to a point known as the Peninsula, the distance is 6 miles in a south-east direction, the space between being divided into several bays by rocky points, all safe to approach within a distance of a quarter of a mile. The ground about midway between Pepré point and the Peninsula rises to a small hill named mount Terceira, which is 300 feet high. The Peninsula appears like a low island when seen from the westward, and there is a remarkable single tree a little inshore of it.

Brandenburg fort.—Eastward of peninsula point, a long straight beach is interrupted by a projecting rock, on which stands the ruin of fort Brandenburg, at the height of 115 feet; and which, being overgrown with dark trees and shrubs, is the more conspicuous from its contrast with the white sandy shore on either side. Westward of the fort there is a small river, which is said to flow from amongst the hills to the northward, and which passes behind the fort to a second outlet at Secan point, a low rocky ridge near the eastern extremity of the beach. There the land rises rapidly to the highest hill in the vicinity of cape Three Points, which has been named mount Heathfield, elevated 445 feet above the sea. Viewed from the westward, it appears as a bold bluff.

West point.—The shore from Secan point turns to the southward towards Frederick and West points, which latter is a rocky bluff, with some rocks at its base, forming the southern extremity of Brandenburg bay, as well as the western extremity of the projection known as cape Three Points.

Winds and weather.—On the coast between Sierra Leone and cape Three Points the rainy season commences in May and lasts until September, with generally a partial break about the middle of August. During this period of the year fresh W.S.W. winds are experienced accompanied by a heavy swell.

Tornadoes are encountered in April, May, and October.

The Harmattan season begins in December and continues during January and February; when this wind is not blowing, southerly and westerly winds prevail accompanied by fine weather.

CHAPTER XI.

CAPE THREE POINTS TO CAPE ST. PAUL.

GOLD COAST.

VARIATION IN 1880.

Cape St. Paul - - - 18° 20′ W.

Gold Coast colony.—The principal British possessions included in this colony are Axim, Dix cove, Elmina, Cape Coast Castle, Accra, Adda, Quitta and Lagos. In 1876 the total population was about 462,000, including natives of the protected portion of the colony; the total value of imports in 1876 amounted to 922,900*l.*, and that of exports to 1,084,528*l.*

CAPE THREE POINTS* lies S.E. by S. from West point distant 1½ miles, and projects from the mainland in a south-westerly direction about half a mile, with a large rock lying 100 yards off its pitch known as the Boidan.

When seen from the eastward or westward the cape appears as two hills, on the northern of which there is a tree known as the Cape tree, and on the southern is situated the lighthouse.

LIGHT.—From a white lighthouse, 20 feet high, erected on cape Three Points, is exhibited from an elevation of 75 feet a fixed white light.

Boidan rock is 20 feet high, and remarkable when seen from either the westward or eastward; it is steep-to, having 5 fathoms close to the surf, which breaks around it.

Between Boidan rock and the shore are some rocks above water, and others which are covered.

Cape shoals.—At three quarters of a mile off cape Three Points, between the bearings of W. by S. and S.W. by S., there are some dangerous rocks named Cape shoals. The least water found on them was 2½ and 3 fathoms, but the soundings all round are very irregular, and the bottom everywhere of rock, the shallow portions of the shoals appearing to be large detached masses with deep intervening fissures. The lead is a bad guide to clear them, as to the westward there is little more than a cable from a depth of 11 to 3 fathoms, and to the southward from 14 fathoms to that depth. These shoals are the more dangerous as the sea does not always break on them, and even when heavy rollers break in succession, there is occasionally a considerable interval of time before others of sufficient volume come up.

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* *See* Admiralty plan.—Cape Three Points, No. 1,713; scale $m=2$ inches; also Admiralty chart.—Africa, West coast, Sheet XIII., Cape Three Points to Barracoe, No. 1,359.

Marks.—East point in line with Aquidah point, bearing E. by N., leads half a mile southward; and West point, in line with the sandy beach east of Frederick point, bearing N. by E. ¾ E. leads half a mile westward of Cape shoals; at night no vessel should approach them on the western or southern sides nearer than 19 fathoms.

Current.—The current is very strong near cape Three Points. H.M.S. *Barracouta*, in August 1873, experienced a current setting to the eastward at the rate of 3 knots an hour, when close south of the cape.

Inner channel.—There is a channel half a mile in breadth between cape Three Points and Cape shoals, but the ground is very uneven, with some rocky heads carrying only 4 and 4½ fathoms. Few vessels can have any object in using this channel, but when necessary, perhaps the safest course to adopt will be to keep close to Boidan rock, as 5 fathoms will be found there, the shoal water seems to lie in the form of a ridge from thence to the outer shoals.

Tides.—It is high water, full and change, at cape Three Points at 4 h.; springs rise 4 feet.

River point.—At half a mile north-east of cape Three Points there is a small rivulet with a rock in the middle of the entrance, and a rocky hillock on its eastern side known as River point; and at half a mile farther eastward there is another outlet to the same stream. Two rocky flats extend here from the beach, on the eastern of which stands a tall stone like a ninepin.

Anama point lies 1½ miles eastward from cape Three Points; it is quite safe of approach, for most of the rocks which lie round it are visible, and have 7 fathoms water close to them.

East point.—A rocky bay, near a mile across the mouth, with a couple of small islets in it, lies between Anama point and East point, which latter bears from cape Three Points E. by S. ⅝ S. distant 2⅓ miles. East point, forming a high salient headland, is steep-to, having 4 or 5 fathoms close to on all sides. A large tree on the elevated ground above the point, has a remarkable appearance when viewed at a little distance on either side, and distinguishes it from any of the adjacent points. The whole extent of cape Three Points, that is to say, the space from West point to East point, is a series of hills with abrupt sides and rocky points, but without dangers that are not visible at all times, the Cape shoals

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Current.—The current is very strong near cape Three Points. H.M.S. *Barracouta*, in August 1873, experienced a current setting to the eastward at the rate of 3 knots an hour, when close south of the cape.

Inner channel.—There is a channel half a mile in breadth between cape Three Points and Cape shoals, but the ground is very uneven, with some rocky heads carrying only 4 and 4½ fathoms. Few vessels can have any object in using this channel, but when necessary, perhaps the safest course to adopt will be to keep close to Boidan rock, as 5 fathoms will be found there, the shoal water seems to lie in the form of a ridge from thence to the outer shoals.

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East point.—A rocky bay, near a mile across the mouth, with a couple of small islets in it, lies between Anama point and East point, which latter bears from cape Three Points E. by S. ⅝ S. distant 2⅓ miles. East point, forming a high salient headland, is steep-to, having 4 or 5 fathoms close to on all sides. A large tree on the elevated ground above the point, has a remarkable appearance when viewed at a little distance on either side, and distinguishes it from any of the adjacent points. The whole extent of cape Three Points, that is to say, the space from West point to East point, is a series of hills with abrupt sides and rocky points, but without dangers that are not visible at all times, the Cape shoals excepted. In the offing the bottom is generally of soft blue mud, though with some sandy and rocky spots.

Coast.—From East point the coast continues of the same character for three-quarters of a mile; the higher lands then recede from it, leaving an undulating country of less elevation between them and the coast, and the shore forms a sandy bay as far as Stephens point, a rocky knoll at the western side of Aquidah cove. The eastern side of this cove is a small peninsula, crowned by the ruins of Aquidah fort.

Aquidah cove is divided into two little sandy bays, the western of which is obstructed by rocks, but the other affords tolerably good landing on the beach at high water, close to a village,* which is built under a grove of cocoa-nut trees. In the rainy season there is a small stream named the Alligator, with its outlet close to the point which separates the bays.

The entrance of the cove is not more than 300 yards wide, with $3\frac{1}{2}$ fathoms in mid-channel, on a sandy bottom, but shoaling rapidly to the beach. From each of the outer points, rocks extend to the south-west about 300 yards.

Achowa point.—From Aquidah a sandy beach 3 miles in length, trends about E. by S. $\frac{1}{2}$ S., terminating at Achowa, a broad point consisting of several rocky projections. Some large rocks above water lie off this point, which may be distinctly seen from cape Three Points; and off each of its angles there is a short reef. On the high ground above its western bill there is a grove of trees, the tops of which are 220 feet above the sea, and which show well when approaching the point, particularly from the westward.

Soundings.—The soundings between East and Achowa points are very irregular between the shore and the depth of 13 fathoms, within which strangers would do well not to approach. That space contains also some rocks near the shore, which are to be seen above water, with channels of 4 fathoms inside of them; while others lie farther out, and carry but 3 feet water, giving little or no warning of approach by the lead.

East rock, on which the depth is 3 feet, lies S.W. $\frac{1}{4}$ S. from Aquidah fort, distant 7 cables.

Aquidah rock, on which there is but 3 feet water, lies S. $\frac{3}{4}$ E. from Aquidah fort distant $1\frac{1}{10}$ miles.

A shoal of 3 fathoms, lies S.W. by W. from Achowa point, distant 7 cables.

These three sunken dangers are the outer of those between East and Achowa points; for a description of those near the coast the mariner is referred to the Admiralty plan of cape Three Points.

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* This village was destroyed during the Ashanti war of 1873.

Achowa village.—The village of Achowa stands in a small sandy bay, half a mile north-east of the point of the same name, and from thence a rocky indented coast extends to Dix cove.

DIX COVE.*—This cove is nearly 400 yards wide at the entrance, and about the same in length, but full of rocks; these leave, however, sufficient room in some places to moor boats or very small vessels. A conical heap of rocks, forming a small islet, lies W.S.W. of Dix cove fort, and a reef of rocks extends from it 230 yards in a S.S.E. direction, leaving a narrow channel on each side of it.

Ahanta point, the south-west entrance point, is surrounded by a belt of rocks, which occupies half the cove; and from Swanzy point, on the eastern side, a similar belt fronts the shore to Hood point, about a quarter of a mile north-east of it. On this belt, and 100 yards southward of Swanzy point, there is a black rock, named by the natives Koombrinee, or the white man's death rock, in allusion to an accident which happened there. There are two boat channels into Dix cove; one between Koombrinee and Islet reef, in which at low water there are only 3 feet abreast of the islet; and the other between Islet reef and Ahanta point, with 6 feet in it; they are both very narrow, but the eastern is generally preferred, though leading close west of Koombrinee rock. At low water and with fresh southerly breezes, the sea breaks entirely across the entrance to Dix cove, but it seldom happens that the natives cannot get off to a vessel in their canoes; and in fine weather ordinary boats can generally land and find shelter in the cove; the bottom is sandy with a depth of 3 or 4 feet among the rocks.

Dix Cove fort.—The town is situated on the north side of Dix cove, and extends from the fort to a piece of water, which is stagnant, except during a portion of the rainy season, when it is always a resort for alligators. The fort is of a square form, standing on ground about 30 feet above the sea, north of Swanzy point, and its battlements are about 30 feet high. It has a large tank for its own use, but vessels of war may generally obtain water from it on application. Very long hoses are required to lead the water from the fort, to a boat at anchor in the small bight at its base. Although the country is covered with forest, the natives object to its being cut anywhere near the town, so that Dix cove is not a good place for wooding. Some refreshments may, however, be procured here for money or barter, but not in sufficient quantity for a vessel of war of any size.

At a mile in-shore from the fort, the land rises to a height of 250 feet, and at 6 miles to the northward mount Swanzy is 390 feet above the sea.

A building with a slate roof, resembling a church, and situated on high ground, north of the fort, is the most conspicuous object when approaching Dix cove.†

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* *See* Admiralty plan.—Dix cove, No. 1,713; scale, *m* = 6 inches.

† Commander H. M. Dyer, H.M.S. *Torch*, 1872.

Abokori islet.—At one mile eastward of Dix cove is situated a small low rocky islet named Abokori, some portions of which are covered with coarse grass. The channel between this islet and the coast is half a mile wide, but near the middle there is a rocky shoal of only 2¾ fathoms, with a narrow passage on either side of it 3 or 4 fathoms in depth. A few rocks surround the islet, but not extending farther than 130 yards from the shore. This channel affords no shelter for vessels.

Bootry.—In the small sandy bay opposite Abokori islet stands the little village of Bushau, close to the beach; the bay terminates 1½ miles farther eastward at Bootry point, which is bold and rocky. N.N.E. of this point there is a rivulet, on the western side of which stands the ruins of the small fort of Bootry or Bartenstein, close to the beach. Bartenstein hill, covered with high trees, and bearing about north from the fort, rises to the height of 440 feet.

The landing is very good at the mouth of the rivulet, though numerous large boulders must be avoided.*

Coast.—At 1½ miles eastward of Bootry a sandy projection of the shore terminates in Adoblo rock, a large black rock shaped like a haystack; from this the character of the coast changes from being almost steep-to, to being fronted by reefs, with irregular soundings and projecting rocky shoals. Adoblo rock is surrounded by one of these reefs, extending a quarter of a mile from it in all directions, and at 1¼ miles farther to the eastward, another reef extends more than a mile from the shore into the stream of 10 fathoms; among all these shoals there are intricate channels available for boats.

Pompendi point.—At about 3½ miles east of Adoblo rock stands the town of Pompendi, on a projecting point, which consists of two stony hillocks with a sandy bay between them; several rocks on which the sea at times breaks heavily lie south of Pompendi point. Above the town there is a grove of large trees, which helps to distinguish the place.

Shoal.—A shoal, with 3 fathoms on it, lies 2¾ miles E. by S. from Adoblo rock and one mile from the shore; from the shoal the grove of trees at Pompendi bears N.E. by N.

Pompendi reef.—From the south extreme of this reef, which extends three quarters of a mile from Pompendi point into the stream of 6 fathoms, the grove of trees bears N. ⅜ W.; foul ground extends to the eastward of Pompendi point for nearly a mile.

Adjuah.—The village and low rocky point of Adjuah are situated E.N.E. of Pompendi, distant 1½ miles, and thence a white beach extends 4 miles to the low sandy point of Tacorady. In this space there are two shoals with 2½ and 3¼ fathoms on them, both bearing S. by E. from Adjuah, the outer and deeper lying three-quarters of a mile off shore ; a little farther to the eastward a broad belt of reefs commences and continues to fringe the shore to Tacorady point, the average distance of its outer edge from the coast being about half a mile. On reaching that point it turns suddenly towards the shore, in a N.N.E. direction and then again suddenly turns to the eastward for a distance of about two-thirds of a mile.

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* Commander H. McN. Dyer, H.M.S. *Torch*, August 1872.

Tacorady reef, detached from the fringe of shore reefs, lies still farther out ; in shape it is circular, its diameter is a third of a mile, and the centre bears S.E. by E. distant about three-quarters of a mile from Tacorady point. Several of the rocks upon it show above water, and though it will be safer for vessels not to approach it within 10 fathoms, yet the lead will lead into 8. A depth of 5 fathoms will be found at the edge of the surf, being 1 1/10 miles from Tacorady point. In navigating between Dix cove and Tacorady point, vessels should not approach nearer to the shore than 11 fathoms, unless desirous of trading.

TACORADY BAY.*—Secondee point bears from Tacorady point N.E. by E. ¼ E. distant 4¼ miles. The coast recedes suddenly to the northward at Tacorady point and forms Tacorady bay, the coast of which is composed of several small bights, divided by rocky points. The ruins of a fort stand on the south side of one of these bights, upon a bold point, about 80 feet above the sea, and nearly N.N.E. distant 9 cables from Tacorady point ; it is now a complete ruin, and so overgrown with shrubs and trees that it cannot be easily distinguished. There is a grove with some tall trees a little northward of the fort, which are very conspicuous ; at the base of the fort there is a village, and another at Appoassi a mile north of it, the natives of which were treacherous. At both of these places boats may land with facility under the protection of the adjacent reefs. From Appoassi, with the exception of one reef close to the shore, the beach is clean as far as Secondee point ; and a vessel may beat up in this bay, when working to the westward, by paying attention to the lead. The bottom is of sand and mud, but rocky near the reefs off Tacorady point. The rollers, which to the westward of that point generally break in upwards of 2 fathoms, are here comparatively smooth.

Tacorady bay affords more shelter than any other anchorage between Fernando Po and Sierra Leone. Water cannot be procured, but goats ducks, yams, and fruit are abundant.†

Barracouta rock, with 2¾ fathoms on it, lies N.E. ½ N., distant 1¾ miles from Tacorady point, and 3 cables from the shore.

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* *See* Admiralty plan.—Tacorady bay, No. 1,713 ; scale, $m = 10$ inches.

† Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1872.

Secondee point is a bold rocky cliff 50 feet above the sea, surmounted by fort Orange, which is a square building of about 180 feet each way, with bastions at the angles.

Secondee is said to be the eastern extremity of the Ahanta country. The soil in the vicinity is prolific, and the population industrious. The yams obtained here are supposed to be the finest on the Gold coast; and the native fishermen cure much fish, with which they traffic in the interior.

Landing.—A flat rock extends a short distance under water E.N.E. from Secondee point, and there is a ledge, on which the sea breaks, about 250 yards N.N.E. of the point; there are 2 fathoms inside this ledge which shelters the landing on the beach at the village. In every other direction a vessel may almost lie alongside the point, close to which there are 5 fathoms, but the soundings are very irregular when approaching it. The bottom is of sand and mud.

Coast.—Abboaddi point is the next salient point east of Secondee, and bears from it E. ¾ N., distant 4½ miles, the coast between forming a bay about a mile in depth, containing several sandy beaches and abrupt rocky points, off which there are generally a few rocks. Between its extreme points the depths are from 4 to 5½ fathoms, decreasing regularly to the shore, and with no danger at a quarter of a mile from the beach. The surrounding shores have a broken appearance, though of a tolerably uniform height when viewed from a distance of 4 or 5 miles, and are without any remarkable features.

Soochoo reef.—Off Soochoo point, midway between Secondee and Abboaddi point, there is a small reef half a mile in length, extending parallel to the coast, with a boat channel inside it. Off the mouth of Anamquon river (which is barred in the dry season) about a mile north-east of Soochoo point, there are a few rocks.

Abboaddi point is a double point of low rocks, from which a narrow reef extends half a mile in an E. by S. ¾ S. direction ; several rocks on this reef are above water, one of which has a white top, and lies 300 yards from the point.

Sherbro Bank.—A shoal of 19 feet, with 4 fathoms around it, lies off Abboaddi point ; from the shoalest part, Abboaddi point bears N.E. ¼ N. distant 1¼ miles, and Secondee fort bears West ; Sherbro bank is about half a mile in extent, and breaks when the rollers are unusually heavy.

Landing.—There is a village situated at the foot of the hillock which rises from Abboaddi point, and the landing to the eastward of it is good, being sheltered by the reef which extends from that point.

Roani bank.—At 3 miles S. by W. ¾ W. of Abboaddi point, in the stream of 11 fathoms, there is a rocky bank one mile in length, named Roani bank ; the least depth on it was formerly supposed to be 7 fathoms, but in 1870 a shoal of 6 feet was reported. It is said to be a favourite fishing ground.

Bassaboo rocks.—These rocks lie E.N.E. of Abboaddi point, distant three-quarters of a mile, the coast between forming a little sandy bay, and from them a reef projects nearly half a mile in an easterly direction. At half a mile farther to the northward there is another foul point with a similar reef extending from it, and from thence to Chama bay the coast is fringed by a succession of reefs, with 3½ fathoms close to their outer edge. They lie within a third of a mile from the shore; but there is one detached rock which generally breaks, and which bears S.S.E. ½ E. distant $1\frac{1}{10}$ miles from the fort of Chama, being one mile from the shore.

CHAMA BAY,[*] extending from Abboaddi point to the Red cliffs of Cotobray, is nearly 2 miles deep, with regular soundings and without any dangers, except those already described to the southward of Chama fort, and Prah rock.

Chama fort.—The fort of Chama (pronounced by the natives Eshama) stands upon a rising ground about 300 yards from the beach, behind the native town, which it overlooks. It is a strongly built square edifice, with bastions at the angles, and surrounded by a wall; the truck of the flagstaff is 74 feet above the sea. The approach to Chama fort is obstructed by reefs of rocks, through which there is a narrow passage for boats at low water (provided the surf be not high), as the winding channel between them may then be perceived. At high water they are all covered except a few large boulders, and the sea breaks so heavily as to present to a stranger no apparent channel. The landing place is to the eastward of the fort, though canoes safely wind their way among the western rocks.

Owing to its dark colour, Chama fort is not easily recognized from seaward.

Boosum Prah river.—At one mile north-east of Chama fort, the river Boosum Prah falls into the bay between two lagoons. It is said to come from a considerable distance inland, but was only examined for about 2½ miles from its mouth, where it was 100 yards across and 4 fathoms in depth. The water was quite fresh, and the banks, which were fringed with mangroves, were only 3 or 4 feet above the stream. There was only a depth of 2 feet on the bar, which was impassable by ordinary boats, the natives, nevertheless, most adroitly paddled their canoes both in and out of the river.

The ground, which to the westward rises considerably above fort Chama, sinks into a flat country to the northward. Some hills, however, are seen in the north-west, and one, distant 9 miles from the fort, bears N.E. by N. from it.*

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[*] *See* Admiralty plan.—Chama bay, No. 1,713; scale, $m = 1{\cdot}0$ inches.

Prah rock, on which there is but 6 feet water, with 3 fathoms close round it, is very small; it bears E. ½ S. from Chama fort, distant one mile; and S.S.E. ½ E. from the mouth of Boosum Prah river, distant half a mile.

Anchorage.—Vessels may anchor in Chama bay in 7 fathoms, sand and mud, with the fort bearing N.W. distant about 1¾ miles; the trend of the coast affords considerable protection from the swell, even in the rainy season.

Cotobray cliffs.—A straight beach, nearly 4 miles in length, extends from Boosum Prah river to the red earth cliffs of Cotobray. These are five in number, with small sandy bays between them, and some large rocks above water at their base. An irregular line of rocks and breakers commences a mile to the westward of these cliffs, and fronts their whole length, but it extends only a quarter of a mile from the beach. The highest land in the vicinity of the cliffs is about 270 feet high, whence the ridge descends gradually to the lagoon near Bossum Prah river to the westward, and to Abroby river to the eastward. That river, like most of the streams on this coast, has no communication with the sea till the rains begin.

Gold hill.—Assay point, or Gold hill, bears E. by S. distant 3½ miles from Cotobray cliffs, the coast between being nearly a straight beach of sand. The point forms but a slight projection from the coast line, but, being surmounted by an isolated hummock, it has a remarkable appearance when seen from the westward.

Commenda point.—From Gold hill to Commenda point the shore is low and fronted by rocks. Commenda point is also low and rocky, and close eastward of it the river Soosn passes between the forts of Commenda. The fort, standing on the western side of the river, is a square building of about 190 feet each way, with bastions at the angles, but having been for some years abandoned, it is rapidly going to decay.

Landing.—A native town stands at the foot of each fort, and tolerably good landing will be found in the little recess of the beach between them, under the high bar of Soosn river, the waters of which seldom break through it in the heaviest rains, but expand into a shallow pestilential lagoon.

Ampenee point.—From the rocky point of Commenda, the village of Akal aki, situated on the beach, bears E. ¼ S., distant one mile, and Ampenee point (which is also low) bears E. ½ S., distant 3 miles. A ledge of rocks extends eastward from Ampenee point about 300 yards.

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* Boosum Prah river is said to be navigable for vessels for a distance of 90 miles from its mouth, above which there is canoe communication with Coomassi.—*Standard*, 24th July 1873.

Cassee reefs, which extend E.S.E. for a distance of 1½ miles, are separated from the ledge off Ampenee point by a 2-fathoms channel available for boats. A depth of 3½ fathoms is found close to the outer edge of the reefs, and the surf at times breaks over them in high rollers.

H.M.S. *Decoy*, in 1873, passed inside Cassee reefs, but found the depths very irregular, having at one time 4 fathoms on one side and 2 fathoms on the other.

Ampenee.—The town of Ampenee, which stands on the shore at half a mile eastward of Ampenee point, contains a large population ; and a little farther to the eastward there is another town, Akimfoo, which is built on the summit of a small hill. Between the two towns the river Akiaboo comes down to the back of the beach, after winding among the rising grounds that approach the coast on its western side ; at three-quarters of a mile east of Akimfoo there is another pent-up river, named the Branoo. The land about here appears broken into small hills, one of the highest of which, on the eastern side of Branoo river, is 200 feet above the sea.

Amquana.—The village of Amquana stands on the beach about 1½ miles eastward of Branoo river, and a little east of the village there is another stagnant river, known as the Bebo.

Boosum Accra reefs. — From about three-quarters of a mile west of Amquana the Boosum Accra reefs front the shore for a distance of 2 miles, showing themselves in four distinct patches, on which the rollers break heavily. There are 4 fathoms close to their outer edge, and their eastern extreme lies half a mile from the shore.

Coast.—From Amquana to Elmina the coast rises into downs of moderate elevations at various distances from the beach, many of them have been cleared of forest, and are now cultivated. The beach is a hard sand, and nearly straight for 3 miles to Elmina point.

Elmina point, the western extremity of Elmina bay, and on which stands the fort of St. George del Mina, is surrounded by rocks, which extend to the eastward about two cables, and on which the sea breaks with great violence, especially when the sea breeze sets in.

ELMINA BAY.—From Elmina point the shore recedes to the northward for about a third of a mile, forming Elmina bay ; the surrounding country is undulating and thickly wooded, with some country residences and cultivated farms which belong to the merchants, and which afford agreeable retreats from the heat of the town.

A remarkable tree, known as the "Ship tree," is situated on the summit of a small hill close east of Elmina; when seen from the offing it somewhat resembles a vessel with topsail and jib set.*

Elmina castle.†—The castle of St. George del Mina was, with the other Dutch settlements on the Gold coast, transferred to the British Government in 1872. The castle stands on a low rocky peninsula, on the southern side of the small river Beyah, which passes within 20 yards of one of its gates. This peninsula is connected by a wooden bridge with the opposite bank, and from this bridge to the sea the river is confined between two stone embankments. A large native town, which occupies the whole breadth of the isthmus, extends along the beach westward of the castle, and communicates with it by a drawbridge.

The fort of St. Jago stands on a hill about 100 feet above the sea on the north side of Beyah river; De Veers redoubt is situated westward of the town south of the river, and Beckenstein redoubt near Beyah river, to the westward of fort St. Jago.

Elmina is a good place to make, when coming from the westward and bound to cape Coast Castle.

Landing.—The rocks off Elmina point are of essential service in sheltering the landing place at the mouth of Beyah river, where the water is, however, very shoal.‡ Ordinary boats can land on the beach at high water. It is said that at one time Dutch vessels of 50 to 90 tons could enter Beyah river at high water, and unload upon the quay.

Boats entering Beyah river should give the reef off Elmina point a wide berth, and not steer for the entrance until it is nearly open, when, by keeping on the northern side, good landing may be obtained west of the bridge.§

Tides.—It is high water, full and change, at Elmina at 4 h. 30 m.; springs rise 6 feet.

Anchorage.—The usual anchorage off Elmina is in 7 or 8 fathoms, sand, or shells and mud, with St. George castle bearing N.W. ½ W. distant about a mile; or with mount Eguoffo well open eastward of fort St. Jago; if necessary, a vessel may anchor for the night in 13 fathoms, 5 miles off the land, between Elmina and cape Coast Castle.

A Government surf boat communicates with vessels of war lying off Elmina.

Coals.—There is a contract for the supply of coals to H.M. vessels of war at Elmina, Dix cove, and Quitta, but coaling can only be very slowly performed.‖

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* Navigating sub-lieutenant F. A. Halloran, H.M.S. *Torch*, 1873.

† *See* Admiralty plan.—Elmina, No. 1,713; scale, *m* = 4 inches.

‡ Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1872.

§ Navigating lieutenant W. W. Browne, H.M.S. *Bittern*, 1873.

‖ Navigating lieutenant C. R. H. Robinson, H.M.S. *Tourmaline*, 1877.

Coast.—A slightly curving beach, nearly 7 miles in length, extends from Elmina to cape Coast Castle; near its western extremity there are two small barred-up rivers, and between them the shore line is rocky, but the rest of the beach is clean, and the soundings up to it regular.

CAPE COAST CASTLE.[*]—The castle of cape Coast (a singular corruption of the original Portuguese name, Cabo Corso) is built on a rock which stands on a projecting point of the line of the shore.

Landing.—The landing-place is in a small bay under the north-east bastions of the fort, behind some rocks which generally afford much shelter from the sea. From the landing-place the ground rises gradually to the castle, which contains the official residences, with a chapel, school, hospital, and storehouses, besides the hall of justice. There are also several spacious water-tanks from which vessels are occasionally supplied, but only by permission. At a short distance from the castle there are three detached forts, situated on commanding hills, fort Victoria, fort Macarthy, and fort William. During the dry season landing in ordinary boats is frequently practicable.[†]

LIGHT. — The lighthouse at fort William, cape Coast Castle, is a white circular stone tower 46 feet high. It stands 600 yards inland, and exhibits from an elevation of 192 feet above high water a *fixed* white light, that in clear weather should be seen for a distance of 12 miles, all round the horizon.

Town.—The town, which is named by the natives Iguah, occupies a considerable space to the northward of the castle; and besides long lines of native huts, contain some handsome European houses; the Episcopalian church and Wesleyan chapel are the most conspicuous public buildings.

The rock of Tabara is the native name for the great mass of granite on which the castle stands, and a large solitary stone standing on the beach about a quarter of a mile westward of the castle, is known as Tabara's wife. A little farther westward there is a small salt-water lagoon, which is only separated from the sea by the ridge of the beach; at the south-west corner of the lagoon there is a little sandy hillock named mount Edgecumbe.

Population.—The number of inhabitants at cape Coast Castle is about 10,000, almost all of whom are natives.

Anchorage.—During the dry season vessels may anchor anywhere off the castle, (avoiding a shoal of 3 fathoms, situated nearly 2 cables S.E. of the castle,) as the ground is clear of rocks, the bottom being generally fine dark sand, with sometimes minute broken shells, and the depth decreases regularly and slowly to the shore; but in the rainy season, when there is usually a long swell, it will be prudent to anchor in 10 fathoms, with the castle and fort William in line, bearing N. by W. ½ W. and about 1½ miles from the castle.

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[*] *See* Admiralty plan.—Cape Coast Castle, No. 1,713; $m = 2$ inches.

[†] Captain G. R. Freemantle, H.M.S. *Barracouta*, 1873.

H.M.S. *Barracouta* in March 1876 anchored in 9 fathoms, a little to the eastward of this position, keeping the landing place on the beach in sight, and thus obtaining a leading wind for boats communicating with the shore.

In the tornado season vessels not moored frequently foul their anchors.

Current.—The current which generally runs to the eastward at the rate of a knot per hour, frequently turns to the westward for a few hours after a heavy tornado.*

Tides.—It is high water, full and change, at cape Coast Castle at 4 h. 30 m.; springs rise 6 feet.

Coaling.—H.M. vessels of war coal from a coal hulk, and in moderate weather 50 or 60 tons a day can be obtained.†

Mumford point.—The village of Mumford is situated at the foot of the hill which rises above Mumford point, lying E. by N. ½ N. distant half a mile from cape Coast Castle; and at three-quarters of a mile east of Mumford point there is a large granite boulder on the edge of the shore, named by the natives Abou Ketu.

Queen Anne point‡ bears from cape Coast Castle E. by N. distant 1¾ miles; the intermediate coast consists of many small bays and rocky points with rocks close to them, which cause an almost continuous line of breakers along that rugged shore. The point is bold and cliffy, and rises to the hill of Acquon with a village and the ruins of a fort on it. At the western side of the hill the small barred river of Barca terminates; the adjacent land is hilly and covered with trees.

Moree point.—This point bears E. by N. ½ N. from Queen Anne point distant 1¼ miles. In the rocky bay between there are several rocks lying from 100 to 120 yards off shore, and on an eminence above the point is situated the ruins of fort Nassau. It is a square building like Secondee fort, and appears to be of about the same size. A rock lies 400 yards eastward of the point, showing two black heads, on which the sea breaks; there is a 2-fathoms channel inside of it. To the eastward of Moree point there are two barred-up rivulets, the Epper and the Amfoor, and from the latter a clean shore, partly sand and partly rock, extends from 1½ miles to the bold commanding point of Anashun.

Brewah rock.—At nearly a mile eastward of Anashun point, and a third of a mile S. by E. from the trading house on an eminence in the village of Brewah, there is a rock which breaks, with 3 fathoms between it and the shore, and 4 fathoms close to its outer edge.

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* Navigating lieutenant W. W. Browne, H.M.S. *Bittern*, 1873.

† Commander L. C. Keppel, H.M.S. *Avon*, 1877.

‡ *See* Admiralty chart.—Cape Coast Castle to Badagry, No. 2,768*b*.

Gwonkom river.—A little to the eastward of Brewah village there is a small lagoon, and farther on a barred river named the Gwonkom. Between Anashun point and Anamaboe, a distance of 3 miles, the beach is very foul, with rocks extending from it to the distance of a quarter of a mile in some places. Between Gwonkom river and Anamaboe there are several large black rocks close to the beach.

Anamaboe fort.—The fort of Anamaboe stands in a little cove upon a flat sandy beach. It is a square building with regular bastions at the angles, and contains good barracks and storehouses, as well as a handsome hall, and other buildings for the accommodation of a garrison.

Anchorage.—The westernmost of the five hills of Cormantine, in line with Anamaboe fort, bearing N. by W. ¼ W., is a good mark for anchoring, as the bottom on that line is of excellent quality, blue mud with sand and shells ; the approach to the shore is quite regular from 9 fathoms at 2 miles distance to 6 fathoms at one mile ; so that a vessel can take any berth according to the season.

Agah point.—At about a mile eastward of Anamaboe is situated Agah point, with a small native town upon it ; some ledges of rock extend a quarter of a mile east of the point, and Agah hill rises above it.

Cormantine fort.—On a hill which rises from a bold rocky base about a mile E.N.E. of Agah point, stand the ruins of fort Cormantine, which is a square building, about 100 feet on each side, with bastions at the angles, and an outwork. On the south-west side of the fort there is a tower, 146 feet above the sea.

Landing.—On the western side of fort Cormantine, on the slope of the hill, there is a small native village ; and on the eastern side a winding path leads to a little sandy bay, which is the usual landing-place. The small river Etsin, barred in the dry season, discharges its waters by two branches during the rains, one into this bay, and the other nearly a mile farther to the eastward.

Cormantine town.—On the eastern side of the valley which Etsin river drains, at the distance of about a mile from the fort, the large native town of Cormantine stands at the corner of a ridge of high ground. In the town there are some very large trees, the tops of which, being 260 feet above the sea, may be seen when as far to the westward as the anchorage off cape Coast Castle.

Salt Pond town, a trading station of some importance, is situated about 15 miles eastward of cape Coast Castle.*

Great Tree hills.—The country in the vicinity of Anamaboe and Cormantine is diversified with hill and dale, but does not appear to be heavily timbered ; there are, however, some remarkably large trees farther to the westward, on a ridge of hills about 4 miles N.N.E. from cape Coast Castle.

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* **Navigating lieutenant C. B. Clark, H.M.S. *Boxer*, 1878.**

Cormantine hills.—The elevations which will attract the attention of the mariner about this part of the coast, are the five hills of Cormantine, which vary from 440 to 610 feet in height, and lie 2½ miles north of Anamaboe; a group of three hills lies about 2 miles farther to the N.N.E., and 4 or 5 miles to the northward of these is situated a blue ridge, on which there are three hummocks.

Coast.—At Cormantine the character of the coast again changes, turning suddenly to E. by S. ½ S., and preserving an unbroken line of straight sandy beach for 15 miles to the village of Koontanquerry. In this extent the approach to the coast is clear, without any off-lying rocks, and the soundings are regular, over a bottom of fine sand and broken shells. The coast is very low, and on its margin are situated 10 villages, each standing in a dark clump of cocoa-nut trees. There are also a few streams, of which the Amissa and Nacqwa are the largest. The former is said to come from a long distance in the interior, its source being close to that of Boosum Prah river, which enters the sea near Chama; in April the current of the Amissa was just strong enough to force a small channel through the sand, not sufficiently wide for a canoe to enter, but it is said to be deep within. Nacqwa river, 5 miles farther to the eastward, spread into a lagoon inside the beach in April, but in May it opened a channel and discharged a large volume of water. At Imooma and Sasra there are salt-water lagoons, and from behind those villages the land begins to rise to a higher elevation. On the bearing of N.N.E. from Nacqwa, distant 3 miles, there is a peaked hill named Brabra Pow, about 430 feet above the sea, and the hill lying N.N.E. of Koontanquerry, which is 380 feet high, is visible from the tower of fort William at cape Coast Castle. Most of this part of the coast is cleared of trees and covered with long grass.

Tantamquerry point.—Two miles of alternate rock and sand extend from Koontanquerry to Tantamquerry point, where there is a native village named Tooam, with a conspicuous whitewashed house in front of it; the landing there is difficult. The old castle of Tantamquerry stands on the crest of a rocky hill, a quarter of a mile eastward of the point; it has long been abandoned, and is now a complete ruin covered with jungle.

Babli point lies 1½ miles east of Tantamquerry point; it is a large black rock, on both sides of which there is a good deal of foul ground. On each side of it there is a stagnant lagoon, and at a quarter of a mile inland from the point, the village of Leggoo appears on a rising ground near a grove of tall trees. N.N.E. of Leggoo, distant 3¼ miles, there is a table-topped hill, 520 feet above the sea, named by the natives Quaben; and further inland there are four other hills, known by the names of the four cardinal points of the compass.

Gammah.—From Babli point the coast to the eastward is formed by several small sandy bays and points, with some detached rocks about them, but not extending more than 150 yards from the shore. The town of Gammah stands on the eastern part of a high double point of rock, 3 miles east of Babli point, with a lagoon in the valley, three quarters of a mile westward of the point. At one mile east of Gammah, and 2 cables from the shore, there is a rock which breaks, with 2½ fathoms close round it.

Apam point.—This point lies E.N.E. of Gammah, distant 2½ miles, and appears like a small hummock on the eastern side of a saddle-shaped hill, which rises immediately from the sea, and which is surrounded by rocks above and under water; these rocks extend nearly half a mile along the coast on either side, and the same distance to the eastward.

Landing.—The bay to the eastward of Apam point is smooth, though shallow, being sheltered by the point and its surrounding rocks; the landing is good and dry when a canoe is employed, but too shoal for ordinary boats. The little river of Apam has its entrance at the head of the bay, half a mile N.N.E. of the hummock, but the bar is only passable by canoes; inside the bar the river spreads into a salt-water lagoon.

Rocks.—Eastward of the river Apam there is a sandy beach 1¾ miles in length, extending as far as the rocky point of Kitchoroo; and in the space between there are some detached rocks, which extend nearly half a mile from the shore, with a 2-fathoms channel inside. Two of them are always above water and appear black; they are named by the natives the Assakri.

Eastward of Kitchoroo point, there is a long ledge of rocks, on which the sea breaks heavily; it is a quarter of a mile in breadth, and fronts the beach for the distance of a mile to the foot of Mamquady hill. The natives of Mamquady village ply their canoes amongst these breakers with great dexterity, and beach and launch them freely under the shelter they afford.

Mamquady hill is bold high land, with a steep ascent from the sea; its highest point at the south-east extreme of the ridge, is 670 feet high. The High range of Mamquady lies in an east and west direction, between 5 and 6 miles inland; the highest point of these hills is 930 feet above the sea; they are covered with vegetation, and the trees on some of them are of large dimensions, forming conspicuous objects for a long distance on either side.

At one mile eastward of Mamquady hill the little river of Munnee forces a shallow passage through the sand, but in the rainy season it is the outlet of a large body of water.

Winnebah point, which is low and rocky, bears E. ½ N. distant 7 miles from Apam point. The town of Winnebah stands on the beach of a small bay on the eastern side of the point, and above the town are situated the ruins of a fort. Two whitewashed trading-houses on the point, are easily seen when approaching from the westward. At low water the landing here is good for canoes, being sheltered by the reefs extending from the point, which are then uncovered ; but at high water it is very difficult.

The natives are described as turbulent and ferocious; yet English merchants formerly resided there and carried on some trade. The neighbouring country is rather low, but undulating, and with more brushwood than forest.

Ayhnsoo river.—This river falls into the sea at a mile eastward of Winnebah point, and being somewhat sheltered by that point, as well as by the adjacent rocks, its mouth is always open.

It is said that the vessels engaged in the slave trade, watered here by means of the natives with their canoes, which must have been a very tedious operation.

Coast.—From Ayhnsoo river a straight sandy beach extends E. ½ S. for a distance of 6½ miles to Meredith point, when the coast again becomes rocky, and turns more to the northward. In this space the coast is low, but behind it the land rises into gentle hills, the highest of which, mount Seniah, is about 370 feet above the sea ; these hills are generally bare of trees, but covered with low stunted bushes.

Long hill, with a grove on its summit, rises to a height of 550 feet, and bears N. by W. ¾ W. distant 6 miles from Meredith point.

At about 10 miles N.N.E. from the same point, a hill with two remarkable hummocks rises to a height of 770 feet; its local name is Brekoo Opra, but to seamen it is generally known as the Paps.

On the bearing of N.N.W. from the Paps, and 16 miles inland, there is a still higher range, which extends 6 miles in an E.N.E. and W.S.W. direction ; near the centre of the range, one part of it, which assumes the shape of a camel's hump, attains nearly to the height of 1,200 feet above the sea. All the hills seem to rise out of an extensive plain.

Barracoe point,* which lies three quarters of a mile E.N.E. of Meredith point, is high and rugged, and of a dirty red colour. On an eminence above it stands the native town of Seniah, as well as the abandoned fort of Barracoe, which is in a state of rapid decay.

Seniah is large and much cleaner than most of the towns on this coast. It is said that vast numbers of large baboons infest the neighbourhood of this place, and commit great depredations.

Coast.—From Barracoe point to the eastward, the coast is formed by small sandy bays and rocky points, at the base of which lie a few rocks ; the land rises to a ridge of moderate height, which lies in a parallel line to the coast as far as Fettah bay.

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* *See* Admiralty chart.—Africa, West coast, Sheet XIV., Barracoe to cape St. Paul, No. 1,360.

Fettah point, situated 2⅔ miles eastward of Barracoe point, is sandy on the western side, but to the eastward a rocky cliff turns at right angles to the coast, and forms a bay half a mile across, at the head of which the town of Fettah stands upon a rising ground, with the little river Kahkoo winding round its foot. When closed in the dry season, this river spreads itself into a lagoon beneath the town.

Landing.—Fettah affords better landing than any place on this part of the coast, except Dix cove and Elmina.

Coast.—At half a mile eastward of Fettah point, a reef projects about a quarter of a mile from the shore ; the remainder of the coast is clean as far as Nyanyano village, which stands among a grove of high trees, 4 miles eastward of this reef ; at the foot of the village a little river passes from behind a small rocky point into the sea. A few rocks lie close off the mouth of the river, and to the eastward of it a long beach, but slightly curved and everywhere safe of approach, extends for 12 miles to Accra.

Country.—At about 2 miles east of Nyanyano village the remarkable hill of Dampah will be observed close to the shore ; its name among the old traders on this coast was the Cook's loaf. This hill is the western termination of a range of high land, lying in a north-east and south-west direction, and which, though it appears to have many breaks in its continuity, steadily increases in height from the coast. At two miles from Dampah hill this range is 600 feet above the sea ; at 17 miles, 1,350 feet ; and at 22 miles, 1,560 feet ; from whence to the north-east it falls to 1,430 feet, but everywhere appears to be covered with forest. Westward of this range, and about 18 miles N. by E. ½ E. from Dampah hill, there is a conspicuous peak known as Nakeem peak, apparently isolated, and about 1,000 feet in height.

The part of the range lying 2 miles N.N.E. of Dampah hill, is a tableland, and round its eastern extreme Secoom river winds down to the sea, which it enters through an open mouth ; the surf, however, was too high for a boat to enter. The stream is supposed to be the eastern boundary of the Fantee country.

ACCRA.—Accra point is formed by a large rock, with its southern extremity (on which fort James is built), rising only 36 feet above the sea. A few detached rocks lie round its base, and the landing-place is on a small sandy beach, scarcely sheltered by those rocks. The surf is so high, and it requires so much skill as well as local experience to pass through these dangers with success, that ordinary boats should never attempt to land ; but the natives in their canoes have from long practice acquired the habit of landing and embarking with ease and safety. The fort is nearly square in shape, and about 145 feet each way, with regular bastions.

LIGHT.—A temporary building 18 feet high, painted *red*, stands on the western bastion of fort James; it exhibits from an elevation of 50 feet above the sea a *fixed* white light, that should be visible in clear weather from a distance of 10 miles.

Town.—The town extends north-east and north-west from the fort; it consists of several narrow streets of native dwellings and some good houses belonging to the English merchants. Westward of the town there are some brackish pools of water, which stagnate after the rainy season.

Supplies.—Water, cattle, fruit, vegetables, and other supplies may be obtained at Accra, but application should immediately be made on arrival to some merchant of respectability. Fish may be caught in abundance at the anchorage.

There is a constant communication between Accra and the Ashantees, who bring from the interior much of the gold exported from this place; the country, as far as the high range of hills recently mentioned, is a fine open plain with a light soil, covered with shrubs and not much heavy timber. The distant hills are covered with dense forest, but the valleys between them are described as fertile and beautiful.

Crevecœur fort.—On the eastern side of fort James, between 600 and 700 yards from it, are the ruins of the fort of Crevecœur. It stands upon a rocky cliff about 50 feet high, and appears to have been of an octagonal form, with a large enclosed space adjoining it, which, as it contains storehouses with other buildings, and a large open tank, was probably the slave yard of the establishment.

Earthquakes.—In 1863 the town of Accra was destroyed by earthquakes.

Christiansborg castle.—At two miles eastward of fort James, the castle of Christiansborg stands upon a rocky point, about 35 feet above the sea. On each side of it the beach forms a small sandy bay, and in front there are a few ledges of rock, on which the sea breaks heavily. Its principal part approaches the form of a square, of about 190 feet in the side, with irregular bastions. Within the main walls there are several buildings, such as a chapel, hospital, and storehouses, with spacious official quarters.

The native town, which lies northward of the castle, has not a very clean appearance; to the westward of it there is a martello tower on a small sandy eminence, and also a black wooden windmill. Farther inland there are a few detached dwelling-houses.

There is a good road between the castle and Accra, with trees on each side, which render it an agreeable walk or drive.

Landing.—The landing at Castle point, which is usually effected under the imperfect shelter of the rocks, is very difficult, and seldom attempted, except by the natives in their canoes.

Soundings.—The soundings along the whole coast from cape Coast Castle to Accra are regular, shoaling gradually towards the shore, up to 3 fathoms, which is as close as boats can generally approach the surf. The quality of the bottom is fine dark gray sand, with broken shells, and sometimes mud. By keeping outside the 7-fathom line all dangers will be avoided.

Anchorage.—At a mile south of Accra there will be found a depth of 5 fathoms; at 1½ miles, 7 fathoms; and at 2 miles, 8 to 9 fathoms. During the dry season, vessels may anchor in 5 or 6 fathoms, but during the rains it will be prudent not to approach nearer than 8 fathoms.

Good anchorage for a large vessel during the dry season may be obtained in 6½ fathoms, sand, with fort James bearing N. ½ E. distant 2 miles; eastward of this position the ground is foul.*

Zahrtman mount.—From the tops of the houses in Accra, Nakeem peak may be distinctly seen in clear weather, bearing N. by W. ½ W. distant about 20 miles; and N. by E. distant 6 miles from Christiansborg there is a solitary hill in the plain, which has been named mount Zahrtman, the summit of which is 540 feet above the sea.

Tides.—On the coast between Accra and Volta river it is high water, full and change, at about 4 h. 46 m.; springs rise 6 feet.

Labbadee village.—From Christiansborg a sandy beach, with a few rocky patches upon it, extends east for a distance of 2 miles to the village of Labbadee, which stands on a little rising ground in the centre of a grove of high trees, nearly half a mile from the beach. At 3 miles farther east there is a large native town named Tassy, but it is not easily perceived, the mud huts and ground being of the same colour. The land in its vicinity is flat for several miles inland, and covered with grass and a few clumps of low trees. To the westward of the town may be seen the remains of fort Augustenborg.

Shoal.—A shoal, on which there is a depth of 3 fathoms, lies E. by S from Accra point, distant 3¾ miles. It is nearly a mile from the nearest shore at Labbadee.

Coast.—Eastward of Tassy the coast line is a sandy indented beach, with a few rocks off the projecting points, and ledges at considerable intervals apart, but neither projecting more than a quarter of a mile. The country is open, with occasional trees or groves, instead of continuous forests, and the native villages are not so numerous and smaller than those to the westward.

Little Ningo.—This village, lying 2 miles east of Tassy, stands on a rising ground, at a third of a mile from the shore; and Temma, situated 5 miles farther east, has a similar position, with a green slope to a bay on its eastern side. On that slope there is a large round-headed dark tree, standing conspicuously alone, and helping to identify the place.

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* Navigating lieutenant E. R. J. Williams, H.M.S. *Avon*, 1878.

Greenwich rock.—In the space between Tassy and Temma villages, about 1½ miles west of the latter, there is a small black rock, on the eastern extremity of a ledge which fronts the shore; it is detached from the coast nearly 300 yards, and lies in the meridian of Greenwich.

Grove point.—At 1½ miles east of Temma village the beach forms a point, from which a reef projects to the southward; and 1½ miles east of this is situated Grove point, with a similar reef projecting to the eastward.

Vernon bank.—From Grove point a spit, which has been named Vernon bank, extends 12 miles in an E. by S. direction, at an angle of about 1½ points with the general trend of the shore. Its formation is very irregular, some casts of the lead showing sand, others gravel, stones, and narrow ledges of rock. The average depth on it is between 5 and 6 fathoms, and on the shoalest part, which is 2 miles south-east of Ponee, there are 4 fathoms.

There is a depth of 10 fathoms close to on its southern side, and on the northern side 8 or 9 fathoms, with regular soundings from thence to the shore, over a bottom of brown sand with minute broken shells. It is believed that there is no danger on any part of this bank, but vessels would do well not to approach it unnecessarily within a depth of 12 or 13 fathoms.

Ponee.—In a bay 1¾ miles eastward of Grove point is situated the town of Ponee, on a rising ground a quarter of a mile from the beach; it is known by a single white house. Two ledges of rocks lie at the foot of the hill, but they are of small extent.

Landing.—The usual landing-place for Ponee is on the beach close northward of Grove point, the reefs off which afford some little shelter.

Prampram.—Eastward of Ponee, distant 3½ miles, the town of Prampram stands, like Ponee, near the summit of a low hill, and is three quarters of a mile from the beach. It may be recognised by two white houses, which are rather in advance of the native huts.

Vernon fort.—Near the beach below the town of Prampram may be seen some native houses, and the ruins of fort Vernon. The landing-place is opposite the fort, on a clear part of the beach, between two rocky shoals, which extend a mile on each side, and on which the sea breaks heavily.

Ningo river.—From fort Vernon Great Ningo bears E. by N., distant 4 miles; and the coast between is formed by a beach, fronted by two rocky shoals.

Ningo river, though small, is said to be always open, and navigable for canoes, whenever the heavy surf which rolls in upon the bar allows them access. Its entrance is very narrow, between two low sandy points. On the eastern point stands fort Fredensborg.

Country.—The country immediately inland of the part of the coast east of Tassy, and to within a mile of Ningo river, is an extensive plain, of pleasing appearance, partly open and partly diversified with groves of large trees, but covered neither by heavy forest nor unhealthy jungle. It contains many hills of various elevation, amongst which there is a picturesque group with a singular outline, rising to the height of 950 feet above the sea, about 12 miles inland, named by the natives the Crobo hills. Other hills will be seen to the north-east, one of which from its form was named the Abbey dome ; and at 18 miles north from the mouth of Ningo river, the well-known peak of Ningo Grande attains the height of 1,431 feet ; this peak is an excellent landmark when approaching the coast between Accra and cape St. Paul from the southward.*

Coast.—For nearly 4 miles eastward of Ningo river the beach is fringed by a broad ledge of rocks, over which a small river discharges, and being protected by them, its mouth is probably always open. The edge of this ledge is nearly steep-to, there being a depth of 4 fathoms as close to it as a boat can approach ; the heavy surf rolls over it incessantly. These rocks are the last seen upon this coast when proceeding to the eastward.

From the above ledge of rocks to the entrance of Volta river, there is an uninterrupted beach of 26 miles in length, and so slightly curved as not to recede more than 2 miles from the straight course between its east and west extremes, which is E. by S. ½ S. For 5 miles east of the ledge a low clay cliff rises immediately from the beach, but it then falls into a ridge of sand with a few bushes upon it.

This ridge is not more than 12 or 15 feet in height, and continues for 13 miles to Occo village, separating throughout that space the sea from the great salt-water lagoon and swamps which are produced by the overflowing of the Volta. From the mast-head the whole face of the country appears a wooded morass as far as the eye can see ; and the surface of the lagoon is broken by large tracts of swamps, some of which are covered with grass, and others by jungle, with here and there a few high trees.

Occo.—The village of Occo is about 250 yards from the beach, near the eastern extremity of the lagoon, and surrounded by cocoa-nut trees, which, as there are no others near it on either side, give it the appearance of an island when seen from a distance. At a quarter of a mile eastward of Occo, the shore, though intersected by swamps, is again covered with verdure, and thick groves of palm trees mixed with jungle, which extend to the banks of the Volta. There appeared to be other villages in the bush, as well as on the beach.

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* Navigating sub-lieutenant R. F. Younge, H.M.S. *Bittern*, 1873.

Addafoah or Little Adda, about 1¾ miles westward of the entrance to the river Volta, is a native village with a few European merchants' houses; the village, built in an hollow, is easily recognised by the mission house, a flat-roofed building standing on the western extremity of the settlement.*

Anchorage.—There is fair anchorage off Addafoah in 7 fathoms, sand. The mail steam vessels call occasionally to ship palm oil, but the treachery of the natives should be guarded against.

VOLTA RIVER.†—This river is said to come from a long distance in the interior, and separating the great kingdoms of Ashanti and Dahomey, passes near the base of Ningo Grande peak, on the north side, at 45 miles from the sea; from thence it takes a south-easterly direction towards the coast, and enters the sea between two low spits of sand, 18 miles westward of cape St. Paul.

Immediately within the two entrance spits the river expands into a wide basin, both banks of which are covered with mangroves to the water's edge. Immediately north of Richard's point, the Volta is joined by the outlet of the great eastern lagoon; and above this junction a group of partially wooded islands, named Kennedy islands, occupies the middle of the reach. On the eastern bank, about a mile north of the entrance points, there is a dark grove, which makes like a bluff headland; at 2 miles to the eastward of this grove there is another in the form of a conical hill, and on the western side of the river there are three other high groves, the trees in the immediate neighbourhood of Volta river attaining an unusual height.

The river begins to rise early in June, and commences to fall about the middle of October.

Adda.—There is a large town named Adda on the right bank of the Volta, about 6 miles from its mouth, and near it is situated the fort of Kongensteen.

Entrance.—Dolben's point, the western spit, is 1½ miles in length; Richard's point, the eastern spit, bears N.N.E. from Dolben's point, distant 4 cables, and between them is the entrance to the river.

Bar.—The bar sweeps round in a semicircle before the entrance of the river, from Dolben's point to Sandy island, that adjoins the shore one mile south-east of Richard's point, the surf on it is generally too heavy for boats to cross.

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* Navigating sub-lieutenant C. R. H. Robinson, H.M.S. *Decoy*, 1873.

† *See* Admiralty plan.—Volta river, No. 397; scale, $m = 0\cdot5$; and plan of entrance to Volta river on same plan; scale, $m = 2\cdot5$ inches.

Under ordinary circumstances the bar can only be crossed by vessels drawing not more than 9 feet; but occasionally a depth of 12 feet will be found upon it.*

Buoy.—A fairway buoy is moored in 6 fathoms, at 8 cables South from the centre of the bar; the position of this buoy is not, however, to be depended upon.

To enter.—The bar should only be attempted on the flood; and it is recommended to pass near the fairway buoy, and steer North, across the bar, until Richard's point appears in line with the eastern part of the high trees on Kennedy islands, bearing N.N.W., when a mid-channel course may be steered between the entrance points, and to a berth in 15 feet, north of the low spit of Dolben's point.

Volta river is navigable for boats to Medica, a distance of 50 miles from the entrance, and a vessel drawing 5 feet can reach Adda, but not proceed beyond it.

Tides.—It is high water, full and change, in the entrance of Volta river, at 4 h. 30 m.; springs rise 3 feet.

Caution.—When passing the entrance of Volta river, allowance should be made for the indraught on the flood; the soundings should not be reduced to less than 12 fathoms, as in 10 fathoms a vessel would almost be within the influence of the breakers.

Coast.—From the mouth of Volta river the shore, which continues to be a straight clean beach, takes an E. by S. ½ S. direction, and for a distance of 7 miles the land is covered with a dense forest, principally of fan-palms.

Atakoo.—The town of Atakoo was once a notorious slave mart; it is situated 8 miles eastward of Volta river, and half a mile from the beach.

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* Commander J. H. Glover, R.N.

CHAPTER XII.

CAPE ST. PAUL TO CAPE FORMOSO, OR THE BIGHT OF BENIN.

VARIATION IN 1880.

Lagos	18° 00′ W.	Cape Formoso	17° 55′ W.

CAPE ST. PAUL.*—From Atakoo the coast line bends gradually to the northward, towards cape St. Paul, on which, at 6 miles from Atakoo, two palm trees may be observed ; at 3 miles farther east, the coast having turned more to the northward, a round clump of trees near the village of Awey or Wyee will be seen ; from here the coast sweeps round rapidly to the N.N.E. for 5 miles to the town of Quitta. The curve of the shore being so gentle, it is difficult to say what part of it should be named cape St. Paul, that name is, however, usually applied to the coast near Wyee.

From Atakoo to Quitta, or in other words the whole sea face of cape St. Paul, is only a narrow ridge or barrier of sand, which separates the sea from that great eastern lagoon, already mentioned as being connected with the river Volta, receiving its overflowing water, and extending to the eastward for many miles. On this narrow strip of sand stands several native towns.

Awey or Wyee.—At this village canoe communication may be had with the shore, and plenty of stock obtained. It may be known by a fan-like cluster of trees, a group of huts, and a flagstaff, with a remarkable clump of trees, named Tebwy, situated 2 miles to the northward and three quarters of a mile inland.

Soundings.—With the two palm trees on cape St. Paul bearing N.N.W. the bank of soundings to the 100-fathom line extends 7 miles from the land ; and in the meridian of these trees it is very flat, dropping suddenly, at a distance of 9 miles, from 22 to 200 fathoms.

Anchorage.—Vessels desirous of communicating with the shore at Awey may anchor at any required distance from it, as there are no off-lying dangers, the soundings are regular, with the bottom of fine white sand near the beach, and mixed with shells and mud farther out.

Jellah Coffee or Jellu-kofi, situated 3 miles north-eastward of cape St. Paul, or midway between that cape and Quitta, when made from the eastward, appears as several islands, the western of them being the clump of trees among which the huts and houses are built. When approached from the westward, the first white house seen, after rounding cape St. Paul, will indicate the place off which to anchor. A large vessel might anchor in 6¾ fathoms, sand, with Quitta fort bearing N. ½ E., and Jellah Coffee flagstaff bearing W.N.W.

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* *See* Admiralty chart,—Africa, West coast, Sheet XV., Cape St. Paul to Porto Novo No. 1,860.

At night care should be taken not to mistake the lights in two or three houses situated a mile northward of Jellah Coffee for those of the village.

Supplies.—Cattle are abundant in the vicinity of cape St. Paul, and may be procured without difficulty from the natives at Wyee, Jellah Coffee, and Quitta. The surf is, however, much too high along the beach to employ ordinary boats for this purpose.

Quitta.—From Jellah Coffee the shore trends about N.N.E. for 2¾ miles to Quitta, a place easily identified by its white fort and clumps of trees, it stands a quarter of a mile from the beach. About 50 huts lie on the southern side of the fort, and the edge of the lagoon is within 350 yards of it to the north-westward. The natives at Quitta are extremely civil, and assiduously meet every demand for refreshments.

The houses of the wealthier natives generally occupy the side of a square, the enclosed area or court being common to three or four of them. There are several narrow streets of such buildings with little picketed enclosures, and some appear to be neatly kept. Both the town and the fort are concealed when southward of them by a large grove of lofty cocoa-nut trees.

Several white factories are situated close to the south side of the fort.

The station near which the naval contractor resides, is situated about 2 miles south of the fort; it consists of two white houses and a flagstaff, which are conspicuous for some distance in the offing.*

Anchorage.—To facilitate communication with Quitta a vessel should anchor as close in as half a mile from the shore, in 7 fathoms; otherwise in 10 fathoms, at 2 miles off, with the fort bearing N.W. The 100 fathom line of soundings lies 9 miles off Quitta on a S.S.E bearing, the soundings abruptly dropping from 38 fathoms, black mud, to 108 fathoms.

H.M.S. *Danae*, in August 1878, anchored in 6¾ fathoms, with Jellah Coffee flagstaff bearing W. by N. ½ N., and the right extreme of houses at Quitta bearing N. ¼ W.

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* Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

Owing to the trend of the coast, vessels at this anchorage lie head to the swell.*

Caution.—It must be borne in mind, while at anchor at Quitta or on this part of the coast, that the tornado often blows on shore.

Country.—From Quitta the banks of the lagoon, previously described as being connected with the Volta river, are seen extending to the eastward, and the country on the northern side is described by the natives as being very productive. The inhabitants of the long intervening ridge, between the lagoon and the ocean, derive all their supplies of provisions from thence, which occasions a considerable canoe traffic between the opposite shores.

Coast.—From Quitta the coast line trends in a straight line N.E. ½ E. for 8½ miles to Elmina Chica, with, like the shore previously described, clean ground in 6 fathoms, at half a mile from the surf. The villages of Acquijah and Blookoos are situated among large clumps of trees at 3 and 4½ miles respectively north-east of Quitta.

The coast between Quitta and Porto Novo is low and flat, presenting to the view a line of green brushwood, with occasional large clumps of palm trees, and a yellow sandy beach on which the surf breaks heavily.†

Elmina Chica.—From Blookoos the coast trends N.E. ½ E. for 4 miles to the former slave station of Elmina Chica, where there is one large white factory, a group of huts, and a high clump of trees which help to mark its position.

Flohow or Porourah.—From Elmina Chica the coast, with the same general appearance, bends gently eastwards for 5 miles to a village on the beach, known as Adaffi, where there are about half a dozen white houses about a quarter of a mile apart which serve to distinguish it from the next coast village, which is named Flohow or Porourah, and which bears east from Adaffi, distant 3 miles. Neither at Flohow village, where there are two white buildings and a village of huts, nor at the intermediate places between it and Quitta, will the signal for a canoe be attended to with any certainty.

Soundings.—Between Porourah and Quitta, a depth of 8 fathoms, over fine brown sand, is found at half a mile off shore, and the 100-fathom line is 13 miles distant, dropping abruptly from 43 fathoms, black mud. Patches of gulf weed may be seen in this vicinity drifting to the eastward.

Porto Seguro.—From Porourah the beach is nearly straight for 25 miles in the direction of E. ¼ S. to Little Popo, the trading port of Bagdad, which lies midway between them; a range of bushy sandhills, with tall isolated trees a mile apart, and with 7 fathoms, dark sand, at half a mile from the shore, extends 18 miles east of Porourah. At 3 miles farther east, just within high-water mark, is situated the village named Gomalouta or Porto Seguro; on the east side of which is a white factory, and on the west side a red roofed house with a flagstaff close to it; these are the only buildings which are conspicuous from seaward.

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* Commander A. Powlett, H.M.S. *Spiteful*, 1876.

† Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

Lagoon.—The lagoon at the back of the beach between Adaffi and Porto Seguro extends east and west, but shoals, narrows, or long windings, make it useless even for canoes. The slaves were formerly marched along the beach, and not moved in canoes to the westward of Porto Seguro.

Supplies.—On this part of the coast, Jellah Coffee is considered the best place for poultry, Adaffi and Porto Seguro for sheep, and Little Popo for fish, vegetables, and fruit. The general price of a sheep or a dozen fowls is 6*s*., and eggs are sold at the rate of 1*s*. a dozen.

Anchorage may be had at one mile south of the eastern extremity of the bush at Porto Seguro in 10 fathoms.

Little Popo.—At about 2 miles east of Porto Seguro there is a clump of trees and a native village, and at 3½ miles E. ¾ S. from Porto Seguro, Little Popo presents an imposing front of beach storehouses and signal poles, one of which marks the residence of the native chief. A creek of the contiguous lagoon comes in an oblique direction from the north-east to within 120 yards of the sea beach, dividing the town (which is a quarter of a mile inland) from the whitewashed storehouses and dwellings that range along the high-water mark for the space of a mile, so that to proceed to the town, either the head of the bight must be rounded, or the creek, which is 14 feet deep and 300 yards wide, must be crossed.

Little Popo is rendered conspicuous by two large white two-storied factories,* and may be readily distinguished from Porto Seguro and Aghwey from its being situated on a strip of beach, almost entirely free from trees, except at its western part, where there is a remarkably thick palm wood.

It may also be known by the extensive clumps of inland trees near it, and the large native village situated west of the white houses; in the centre of this village there is a conspicuous white-roofed house.†

Little Popo is one of the principal calling places of the mail steam packets.

Anchorage.—A convenient berth for anchoring may be taken with the eastern extreme of the stores on the beach bearing N. by E. ½ E. in 8 fathoms, fine sand, about a mile off the heavy surf.

Caution.—A night should not be passed closer in than a mile from the shore, and even at that distance, on any part of this coast, a second anchor should be ready in case of a roller snapping the cable when there is no land breeze.

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* Navigating sub-lieutenant C. E. Pritchard, H.M.S. *Ariel*, 1876.

† Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

Soundings.—The 100-fathom line lies 15 miles off Little Popo in a south-east direction, the depth increasing suddenly from 48 fathoms, black mud, to more than 200 fathoms.

Current.—The gulf weed is swept in by the swell to within a mile of the shore, and lies obliquely to the set of the current, which is to the eastward, except in the harmattan season.

Aghwey.—From Little Popo, the coast trends E. ¾ S. for 4 miles to another native village named Aghwey, with a white house at the east extreme and a red-roofed house at the western.

Aghwey may also be known by two branchless withered trees, situated a little to the eastward of the town.

Anchorage.—H.M.S. *Danae* anchored in 10¼ fathoms, at 2 miles off Aghwey, with Little Popo bearing N.W. ¼ W., and Aghwey bearing N.N.E.

Bae.—At about 8½ miles east of Aghwey there are two conspicuous factories, the western of which is surrounded by a black paling, and the eastern, consisting of two red houses, by a white paling.*

Great Popo.—The shore for 11 miles east of Aghwey is bushy, with scattered palm trees, as far as Great Popo, eastward of which the sand ridge is broken through by the occasional outfall of the lagoon.

Several dark dome-shaped trees, situated two or three miles eastward of Aghwey are the most conspicuous objects on this part of the coast, when seen from a distance of 7 or 8 miles in the offing.

There are several factories at Great Popo, but they are not conspicuous from the offing, the town lying at the back of the sand ridge. An elevation of the ground, rising to the height of abont 200 feet, and surmounted by a few trees, stands 6 miles to the eastward, and is commonly known as mount Pulloy or mount Palaver.

The outlet of the lagoon in January 1877 was situated about mid-way between Great Popo and mount Pulloy; the channel lay in a north-west and south-east direction, and for a distance of 2 miles off shore the water was much discoloured.†

Great Popo may be readily distinguished, when near, by two long white flat-roofed houses on the beach, one on either side of a white house with a gable roof; there are also two stores with red roof situated a short distance westward of the station.*

Whydah.—The coast from Great Popo for 11 miles in the direction of E. ¾ S., resumes its former appearance as far as the next principal trading station, the seaport of Whydah. This place lies 8 miles eastward of mount Pulloy; it may be known when 3 miles to the westward of it by two dark clumps of trees, named the Brothers, and when made from the south-westward two white factories are conspicuous. The town on the banks of the lagoon is further distinguished by there being seven flagstaffs in it.* The beach station of Whydah presents to the view from seaward half a dozen storehouses, sheds, and huts, all of which, when on a northerly bearing, make out clear of the western fall of a high grove of trees in the background. In the centre of the town on the beach there is a dark-colored house with a white roof and a flagstaff near it.† The lagoon town of Whydah lies 3 miles from its seaport, on the northern shore of the lagoon, which, here approaches to within half a mile of the beach, is only a quarter of a mile wide and 4 feet deep. The lagoon town is built on slightly rising ground, and is estimated to contain a population of about 12,000. Supplies of live stock, vegetables, fruit, and, if desired, small casks of water can be obtained here; the surf is heavier than to the westward. Whydah is considered to be more liable to intermittent fever than the other towns on this windward arm of the bight of Benin.

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* Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

† Navigating lieutenant W. H. Turner, H.M.S *Spiteful*, 1877.

There is a weekly mail service with England, carried on alternately by the African steamship company and British and African Steam Navigation company.‡

Anchorage, convenient for communication with the shore, can be obtained one mile off Whydah in 7 fathoms, brown sand, with the highest storehouse bearing North. The 100 fathom line lies 12 miles from the shore, the soundings dropping into deep water from 48 fathoms, black mud, with 13 fathoms midway between that depth and the coast. The discharge of the freshes at Great Popo gives a greenish tint to the sea that sometimes extends to this place.

Current.—Between cape Coast and Whydah, during July and August, the current has been observed to be irregular, both in strength and direction, setting to the westward occasionally with a velocity of half a knot an hour.†

Godomay or Jackin.—The coast extends E. by S. for 10 miles in a direct line from Whydah to Jackin which slightly projects, and may be known by a remarkable mop-headed tree, at the eastern extremity of some picturesque groups of palms; it is known as the lone tree, and is situated about 2 miles westward of the factory, making out clearly, westward of a grove in the background, when brought to bear North. A solitary white house is also conspicuous.§ No huts or canoes are visible from the offing.

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* Lieutenant O. Churchill, H.M.S. *Ariel*, 1876.

† Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

‡ Navigating lieutenant A. Hackman, H.M.S. *Sirius*, 1876.

§ Navigating sub-lieutenant A. S. Mills, H.M.S. *Contest*, 1876.

Banks.—A shoal of 5½ fathoms, lies S. by W. from Jackin, distant one mile, and at about 2½ miles south of Jackin, the existence of a bank on which the least water found was 6¾ fathoms has been reported.

From the eastern edge of this bank the lone tree bears N. ½ E.*

Cutanu or Appi.—With a gentle bend to the northward the same character of coast continues 10 miles eastward of Jackin to Appi, which may be recognised by a white house on the beach between two long storehouses, which are open of each other when bearing N. by E.; † and by a vista through the flat jungle on the shore, which opens on the bearing of N. by E. ½ E. The 100 fathom line recedes here to 17 miles from the beach, the depth increasing suddenly from 66 fathoms, black mud, to more than 200 fathoms.

Appi is a larger village than Godomay, and there are generally several vessels loading with palm oil here, while at Godomay there is seldom more than one vessel at a time.

At Appi there are three factories, the western of which is red, and the others white; the native village stands between the red and white factories.‡

Porto Novo.—At 9 miles east of Appi, with two small villages intervening and dividing the space nearly equally, is situated the next trading station named Porto Novo, the seaport of the town of the same name, situated at the eastern part of Porto Novo lagoon, 10 miles E.N.E. from the landing-place on the coast, and 50 miles westward of Lagos. A single hut at the high-water mark, and a grove of table-topped trees, which appears through an opening in the foreground, and lies a mile inland, are the only marks for this place, which was formerly notorious for shipping slaves, and for constantly having suspicious craft, under various colours, at anchor off it.§

Anchorage.—There is good anchorage in 8 fathoms, sand and mud, at 2 miles S. by W. of the hut, and the 100-fathom line of soundings is 16 miles from the coast on that bearing, the soundings deepening abruptly from 44 fathoms, black mud.

Badagry.‖—With the same description of foreground, but with continuous groves of high trees in the distance, and occasional clumps in the intervening plain, the coast is nearly straight from Porto Novo for 18 miles in an E. by S. direction to the landing-place of Badagry, which is rendered conspicuous by a couple of barrel posts, a store shed, a flagstaff, a whitewashed hut, and an iron house, besides a pyramidal clump of bushy trees immediately to the eastward, known as mount Badagry ; there are also two saddle-shaped clumps of trees and two groups of huts at 3 and 6 miles to the westward of Badagry.

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* Navigating lieutenant A. W. Torlesse, H.M.S. *Spiteful*, 1878.

† Navigating sub-lieutenant G. D. Lee, H.M.S. *Ariel*, 1874.

‡ Navigating lieutenant R. J. Rogers, H.M.S. *Seagull*, 1878.

§ *See* Admiralty chart.—Africa, West coast, Sheet XVI., Porto Novo to Jaboo, No. 1861.

‖ *See* Admiralty chart.—Badagry to cape Formoso, No. 2,768*a*.

Town.—Badagry, containing a population of 15,000, is situated on the north side of Victoria lagoon, 33 miles westward of Lagos (there being no large settlements between these places), and a mile from the landing-place, out of sight of either the anchorage or beach.

Anchorage.—Convenient anchorage may be obtained off Badagry in 8 fathoms, mud and shells, with the white hut bearing N. by E. distant about a mile. The signal for a canoe will be promptly answered here, and every attention paid to applications for stock and refreshments.

Zoozoo.—The coast line eastward of Badagry presents the same appearance as that to the westward, and has similar soundings off it for a distance of 9 miles to Zoozoo, which may be recognised by a grove in the background, surmounted by two umbrella-shaped palm trees.

On the coast between Badagry and Zoozoo is situated one village, and some rows of salt pans will also be seen.

Coast.—From Zoozoo the coast line trends about E. by S. ½ S., gently curving both in and out for 24 miles to the opening of Lagos river.

The western half of the distance from Zoozoo to Lagos is very flat and bare, having but few trees and no huts upon it ; but the eastern half shows a densely-wooded background that rises from the margin of the lagoon.

The two low, bushy, and sandy points at the entrance of Lagos river with woods in the distance, two clumps of trees somewhat inland at 4 and at 5 miles eastward of the entrance, the single palm, situated 1½ miles east of the entrance and the flagstaffs on the eastern entrance point, form the distinguishing features of the coast in the immediate vicinity of Lagos river.

At about 12 miles west of Lagos river there is a conspicuous high knoll, and at 5 miles west of that river, close to the beach, there is a large square conspicuous house and several clumps of trees.*

LAGOS RIVER† is the first permanent break in the coast line to the eastward of cape St. Paul, and through it the periodic accumulation of the freshes in the lagoons finds a vent to the sea, occasioning a surf of no ordinary kind upon the bar.

The river is situated at the southern part of the extensive lagoon known as Lagos lagoon, and the principal channel passes west of Eko or Lagos island.

Entrance.—The entrance to the river is between Beecroft point (on which there is a clump of trees and two white beacons) on the western side and La Greslie point, the eastern entrance point, a low sandy continuation of the mainland, on which there are several factories.

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* Lieutenant A. W. Warry, H.M.S. *Mallard*, 1877.

† *See* Admiralty chart.—Lagos river, No. 2,812 ; scale, *m* = 5 inches.

Lagos.—On the western side of Lagos island there is an important settlement, at which there are numerous factories and several conspicuous houses with red roofs ; at the settlement there are several wharves, affording facilities for loading and unloading cargo.

The town is situated about 3 miles north of Lagos bar.

Trade.—In 1876 the colony of Lagos was in a flourishing condition ; the value of imports was 476,812*l.*, and that of exports, consisting of palm oil and palm kernels, cotton, ivory, and ground nuts, 619,260*l.* In 1877 the revenue was 59,389*l.* and the expenditure 42,305*l.*

Population.—In 1876 the population of the Lagos settlements amounted to 62,021.

Supplies.—The well water at Lagos is very good, the best being obtained on the mainland opposite the church. Coals are supplied in flats that carry about 4 tons. Provisions of all kinds are abundant.

LIGHT.—Pending the erection of a lighthouse, a harbour light is exhibited from a mast, on the beach eastward of the lagoon at Lagos.

The light is a fixed *red* light, elevated 47 feet above high water, and visible in clear weather from a distance of about 7 miles.

Tides.—It is high water, full and change, at Lagos at 6h. ; springs rise 3 feet.

The ebb stream makes down the river beneath the surface about 3 hours before the stream on the surface turns. The flood stream makes, but is not perceptible till within an hour or an hour and a half of high water ; then it runs with great rapidity, as much as a boat can pull against. Within the river the rise of tide in the fine season is not more than one foot ; during the rains the river is said to be swollen nearly 3 feet. When the ebb stream makes, the rush is so great, that large masses of the banks are swept away, sometimes carrying men and cattle with them.

Current.—Between Badagry and Lagos the current has been observed to have a set towards the shore.*

Outer Anchorage.—Merchant vessels anchor in 7½ fathoms, with the entrance of the river open. Vessels of war anchor in 10 fathoms, with Beach house and Government flagstaff in line ; or a good berth, is in 6 fathoms, at 1½ miles off shore, with the east entrance point bearing N. by W. ; here a vessel will be out of the stream of the river, and ride head on to the heavy swell that always rolls into Lagos roads, and which renders it an uncomfortable, if not dangerous, anchorage.

A small steam vessel is sent out to any vessel of war firing a gun and hoisting a red ensign.

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* Navigating lieutenant C. R. H. Robinson, H.M.S. *Tourmaline*, 1877.

Rollers.—The rollers are heaviest from June to August.

Bar.—Between the entrance points there is an extensive spit, about a mile long north and south, on which the sea breaks heavily, leaving a shifting channel on each side of it; of these that to the westward is available for vessels, the eastern channel is only suitable for boats.

The entire breadth of the channel at the entrance is half a mile, and through it the lagoon pours out, about half ebb, such a volume of surface scum, of a deep brown tint and of a sickening odour, as to spread to a distance of 3 miles from the coast; the edge of this discoloured water is marked by a well-defined margin, as it rolls forward on the deep blue water of the offing.

During the rainy season, the discoloration of water produced by the discharge from Lagos lagoon is perceptible when at a distance of from 7 to 10 miles eastward of Lagos.*

From May to September the bar passage is intricate and curving, but for the remainder of the year it is generally straight. At all times there is a break across the bar, being worst during the rainy season, (June–September), when sometimes steam vessels cannot cross. No vessel ought to draw more than 7 feet if intended for regular employment in carrying cargo over, and even less draught would be an advantage. The bar is very treacherous in its shifting, sometimes in the course of a day the channel will shift 40 or 50 yards; the depth is also variable, altering as much as a foot in two or three days. During the year the depth on the bar varies from 5 to 9 feet at low water. Vessels drawing 12 feet have been towed across, but 9 feet may be considered generally the maximum draught which can enter.† No vessel should attempt to cross without a local pilot, as the Admiralty chart cannot be of much use, and nothing but constant practice can ensure safety, although the channel is buoyed and leading beacons are placed on shore.‡

There are two colonial and four merchant steam vessels that ply over the bar, but they are only of small power.

Signals.—The following bar signals (Commercial code) are shown from a flagstaff on the east entrance point:—

For bar boats	Smooth bar, Flag	S.
	Bad „ „	B.
3 hours before high water	-	3rd pendant.
2 „ „	- -	2nd „
1 „ „	- -	1st „

At high water the pendant will be hauled down and flag S. or B. hoisted.§

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* Navigating lieutenant W. Scriven, H.M.S. *Druid*, 1872.

† Navigating lieutenant C. R. H. Robinson, H.M.S. *Tourmaline*, 1877.

‡ In January 1878 the depth at high water on Lagos bar was found to be 14 feet.—H.M.S. *Mallard*, 1878.

§ Navigating sub-lieutenant, G. D. Lee, H.M.S. *Ariel*, 1874.

Buoy and Beacons.—In 1877 the western side of Lagos bar was buoyed with three buoys:—the outer white in 5½ fathoms; the middle black in 4½ fathoms; and the inner a temporary black buoy on a shoal of 10 feet.* On Beecroft point, the western entrance point, there are two white beacons.

Channel.—After passing Beecroft point, keep the western shore on board until the water shoals to 18 feet, then haul over to point Wilmot on the eastern shore, and continue up the river on that side. Take care in crossing over to allow for the tide.

Anchorage may be obtained abreast the town of Lagos in 12 to 20 feet.

Boat entrance.—Should it be desirable to enter the river in a boat, a suitable opportunity must be waited for; this will be soon apparent (in the fine season) by the inner part of the middle spit becoming dry; then wait till it is nearly covered again, when it will be certain that the flood is making, when pull through the eastern passage, keeping just outside the rollers and close to the beach, passing within a few yards of La Greslie point. This is the best and only safe passage that can be constantly used by boats (tide permitting) throughout the year.

The western passage is only available for boats and canoes during the dry season or in very fine weather. When the sea breeze blows strongly, the sea breaks right across it; and when such is the case, great care should be used in attempting the eastern or boat passage, which should not be done without local knowledge, for the danger of upsetting is great. During the dry or fine season, from November to the end of January, and sometimes February, there are numerous passages for boats between the sandbanks at the mouth of the river, which can be used with safety.

Soundings.—On a S.S.W. bearing, from Lagos bar, the 100 fathom line of soundings lies 19 miles from the shore, the depth increasing suddenly from 70 fathoms, black mud, to more than 200 fathoms, with a depth of 29 fathoms and an occasional overfall at 9½ miles from the coast; the 10-fathom line approaches within two miles of the shore.

Quoin village.—The coast immediately eastward of Lagos resumes its usual characteristics. A native village lies at 7 miles distance on the bearing of E.S.E., and from its relative position with respect to the quoin-shaped clump of trees lying 1¾ miles northwest of it, is named Quoin village.

Jacknah.—From Quoin village the shore trending to the eastward is nearly straight, and presents nothing to view but a ridge of dense jungle for 12 miles, at which distance from the village there is a group of palm trees, resembling in shape a fan, and then several isolated trees, with one village, 6 miles eastward of which is situated Jacknah, a place showing but half a dozen huts in a grove of palms. Jacknah is the northernmost part of the bight of Benin, the windward arm of which begins there to recede to the southward, and trends E. by S. ½ S. for a distance of 6 miles, to Palma village.

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* Navigating sub-lieutenant C. E. Pritchard, H.M.S. *Ariel*, 1876.

Between Jacknah and Palma there are two small villages.

Palma.—This village may be identified by five huts, with palm trees at equal distances apart, situated at the eastern gables of each of the four eastern huts, and by three remarkable palm trees at a quarter of a mile eastward of the village, the middle tree being about half the height of the other two, and the whole group standing out in strong relief.

Avons deep.—The regularity in the bank of soundings, at 30 miles east of Lagos and south of Palma village, is interrupted by a remarkable submarine feature known as Avons deep, in which the depth of water suddenly increases at the outer part from 70 fathoms to more than 200 fathoms, and at the inner part from 40 fathoms to more than 200 fathoms.

The centre of this remarkable submarine valley is situated in lat. 6° 10′ N., long. 4° 00′ E., at which position the 100-fathom margins of the bank of soundings are 8 miles apart, and from whence the deep water trends about north for 10 miles, the 100-fathom edge of soundings on either side gradually approaching each other.

The northern part of Avons deep is about 7 miles from the shore, bearing S.S.W. from the village of Palma.

There is no overfall, nor anything on the surface to indicate the existence of this singular conformation at the bottom ; nor is there any opening in the adjacent coast, or any apparent change in its character. The prudent navigator, however, should be upon his guard when in its neighbourhood, for if approaching the shore at nightfall, or in hazy weather, in dependence on the lead, and intending to be close in at daylight, he might be fatally deceived by a cast with no bottom in this deep, imagining his vessel outside the bank, instead of within 6 or 7 miles of the beach. In some cases, however, this deep, like the Bottomless pit, may be of material service to the seaman at night, by giving him a fresh departure.

Coast.*—From Palma village the general direction of the coast line is E.S.E. for 36 miles to the termination of the sandy beach ; the western 21 miles showing a dark undulating bushy foreground, and a distant and paler coloured background of trees, which afford a striking contrast. The next

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* *See* Admiralty chart.—Africa, West coast, Sheet XVII., Jaboo to Forcados river, No. 1,862.

9 miles of coast is very flat, though bushy, and with no groves in the background; the remaining 6 miles has the back as well as foreground features. A village with four huts is situated on the shore, 3 miles eastward of Palma; a single hut stands 6 miles farther east; and at 2½ miles beyond that, and altogether 11½ miles east of Palma, is situated the western of three remarkable vistas, with a village and group of palm trees, named Jaboo. These vistas or lagoon entrances lie 5 and 12 miles apart, and appear open only when abreast of them; they are each about a quarter of a mile wide at the beach, and they cross the island of Curamo at right angles.

From Jaboo the coast trends about S.E. by E. ½ E.; there is a native village at 2½ miles from Jaboo; then a single hut and the entrance to Kasson vista at 2½ miles farther. Kasson village, where there is a flag-staff, lies 2¼ miles east of Kasson vista, and from thence the sandy beach on which are a few huts, extends 10 miles to Odi vista, the eastern of the three.

Odi.—At 5 miles eastward of Odi vista stands the village of Odi, with its two conspicuous palm trees; and a quarter of a mile farther east an abrupt and remarkable change occurs in the nature of the coast, from sand to mud, the dry soil, palm trees, and brushwood being succeeded by swamps and mangroves. With the alteration in the character of the coast its direction also changes to the southward, and flats of 5 fathoms extend 5 miles off shore. This termination of the sandy beach is a striking feature in the navigation of the bight of Benin. Thus far a vessel approaching from the westward may fearlessly run along the coast at the distance of a mile, except at the projecting bar of Lagos river, but after passing Odi vista, muddy shallows of 3 or 4 fathoms in depth will be found within 2½ miles of the shore.

Coast.—The coast for 6 miles east of Odi village is a mud-flat; no background trees give effect to those that are scattered along the margin of the sea, and the surf which breaks fully a mile off shore is no longer heard. At the southern extreme of this mud-flat, two little openings into the lagoon like vistas may be observed; the shore then assumes a somewhat firmer character, and is interspersed with clumps of trees and scattered huts as far as the group of villages named Town; whence to Benin river the coast line is slightly concave, but its general trend is S.E. by S. for 27 miles.

Delta of Niger river.—At Benin river the delta of the Niger may be considered to commence, extending in a south-easterly direction for about 120 miles to the most frequented mouth, known as the Nun entrance. On this extent of coast there are ten rivers, all supposed to communicate with the Niger, From Nun entrance the coast of the delta trends in an easterly direction for about 140 miles to Old Calabar river, on the intervening coast are the openings of eight small rivers.

These streams are locally known as the Palm Oil rivers.

BENIN RIVER.[*]—The entrance to this river is difficult to distinguish from seaward ; the northern entrance point, 100 miles south-east from Lagos bar, forms a well-defined elbow, while on the southern side there is only a gentle curve, particularly difficult to recognise when bearing N.E. ; from abreast of the northern entrance point the opposite shores take a parallel direction for 4 miles, in about a N.E. ¾ E. direction, and are 1½ miles apart ; both sides are flat and swampy, but inhabited. There is a trade from this river in palm oil and ivory ; the palm oil factory is built on Battery point, situated on the eastern side 4 miles within the entrance, and 1½ miles north-east of the village named Booby town (Obobi) ; a low green islet lies a third of a mile north-west of Battery point, and between them is a sandbank. There are three villages on the north shore of Benin river, one of which, standing opposite the factory, is known as Fish town ; on the round of the south entrance point stands a village, named Salt town. At 2 miles south of Salt town the shoals forming the eastern part of the bar commence, and extend in a north-west direction for a distance of 4 miles, with heavy breakers on them, and a shelf of sand and mud, half a mile in breadth, fronts the coast.

It is never advisable for strangers to spend a night within the bar, as the exhalations from the river are notoriously unhealthy.

Bar.—Between the shoals and heavy breakers which extend from both entrance points of the river, there is a general depth of 9 feet at low water, and at nearly midway between the breakers on either side there is a channel, a mile in breadth and about three-quarters of a mile long, where a depth of 12 feet will be found at high-water neap tides ; but as an incessant swell causes a great undulation, no vessel of more than 6 or 7 feet draught ought to attempt the bar ; and even then the state of the sea should be well considered, as it sometimes unexpectedly breaks with overwhelming force.[†]

The bar is so dangerous and uncertain, that merchant vessels usually remain in the outer road to load or discharge cargo.

To enter.—The leading mark across the bar of Benin river is Harrison house (easily recognised as being a conspicuous white house on the western shore, the western and largest of four), just open of the north entrance point, bearing N.E. ¾ E. ; this mark will lead over in 12 feet at high-water neap tides. When about one mile from North point, gradually haul to the eastward, rounding it at the distance of about half a mile, and when it bears N.W. steer along the western shore in from 2½ to 5 fathoms, keeping from 3 to 5 cables from the bank. Off Harrison house there is good holding ground in 7 fathoms, about 3 cables from the shore.

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[*] *See* Admiralty plan.—Entrance of Benin river, No. 620 ; scale *m* = 0·8 inches.

[†] H.M.S. *Pioneer*, drawing 8 feet 8 inches, crossed this bar in October 1876.

Benin Road.—The roadstead is the only suitable anchorage for all trading vessels; and there the agents and natives will receive or deliver a cargo in local craft, aided if possible by a small steam vessel. In this road much rolling and pitching must be expected, but it affords good holding ground; the most convenient position for anchoring will be found in 4½ fathoms, black mud, with the north entrance point bearing N.E. ¾ E., which is the line of bearing for leading over the deepest part of the bar. This anchorage is 3 miles outside the bar, and 5½ miles from the river's mouth. The lower reach of the river will appear open, but from the roadstead the houses are not distinguishable from the deck.

Tides.—It is high water, full and change, in the entrance of Benin river at 4h. 30m.; springs rise 7 feet; the flood stream runs only 3 hours, at the rate of 2 knots an hour, and the ebb as much as 9⅓ hours at 3 knots an hour. The discoloured water discharges itself over a range of 9 miles' radius from the mouth of the river, and the 100 fathom line of soundings lies West distant 28 miles from the shore, the depth increasing from 95 fathoms, black mud, to 119 fathoms.

Coast.—From Salt town, on the south entrance point of Benin river, the coast line trends about S.S.E. for a distance of 10 miles; it is everywhere thickly wooded, but some remarkable clumps of fantastically shaped trees are conspicuous, some resembling the letter Y, while others have received the names of Ship-tree, Giraffe-tree, and Tower-tree. On the narrow sandy beach the swell breaks but slightly, after rolling in across the 5-fathoms flat, which extends 5 or 6 miles off shore.

ESCARDOS RIVER.—The funnel-shaped opening of the river Escardos which, unlike that of the Benin, has its southern entrance point the best defined, lies 13 miles south of Benin bar. Heavy breakers extend from this point for 3 miles to the north-west, and at first sight appear to join those from the northern entrance point, but there is occasionally a space at one-fourth of the distance across from the latter, where 8 feet water may be found; this channel is however too precarious and uncertain to be safely used. Should any enterprise induce some small vessel to enter this river, it is advisable to cross the bar with the north entrance point bearing E. by S., and then after rounding that point closely, keep well over on the northern side of the river.

Tides.—It is high water, full and change, in Escardos river at 4h. 27m.; springs rise 5 feet. The discoloured water is seen when 6 miles seaward of the entrance.

Coast.—From the south entrance point of Escardos river the coast trends S.S.E. for a distance of 11 miles to the entrance of Forcados river, being fronted by heavy breakers, which extend 2 miles from the shore for the northern 8 miles of that distance.

FORCADOS RIVER.—The entrance to this river is obstructed by a bar, but as the channel across carries 15 feet at low water, and is of considerable width, Forcados river may be considered the most accessible estuary of any on this part of the coast, with smooth water 5 fathoms deep immediately within the bar; though the treacherous disposition of the natives prevents much trading intercourse, yet small vessels of 10 feet draught might avail themselves of that smooth water to refit rigging, &c., always supposing them to be well armed.

Forcados river affords a ready means of communication with Warré, the chief seat of a brisk palm-nut kernel trade recently opened in Benin; hitherto Warré has been reached through the tortuous channel of Benin river the distance by this route being reported as 150 miles from the sea, but a shorter track, by using Forcados river, has lately been explored, the channel being deep and direct. A Hamburgh steam vessel, drawing 7 or 8 feet, came down from Warré by using this route in 5 hours, whereas the passage by Benin river takes 12 hours with the tide.

Forcados river belongs to Chinomé, son of Queen Doto, of Warré, who is willing to have the river used, and offers to protect vessels trading to Warré by this route.

Bar.—From a sandy knoll above water, abreast of a village on the north entrance point, heavy breakers extend 2½ miles in a south-west direction, and between their southern edge and the heavy breakers extending from the south entrance point, is the channel into the river.

The fairway course over the bar is with the centre of the opening bearing E.S.E. There is reported to be 20 feet on the bar at high water, the shoalest part of the channel forms a narrow ridge.

Tides.—It is high water, full and change, in the entrance of Forcados river at 4h. 22m.; springs rise 5 feet; the flood stream run 3 hours, at the rate of 2 knots an hour; the ebb 9½ hours at 3 knots an hour, propelling the discoloured water 13 miles seaward.

Soundings.—The bank of soundings to the 100-fathom line extends 30 miles west from the mouth of Forcados river, deepening suddenly from 90 fathoms, black mud, to 180 fathoms, sand. The 5-fathom line which lies 5 miles west of Forcados river, approaches the shore a little to the southward of it to within 3 miles.

Coast.*—The coast southward of Forcados river has the same monotonous features as that to the northward; a dense forest and thick jungle rises from a narrow sandy beach, on which the surf but feebly breaks. In the whole space between Forcados and Dodo rivers there is no sign of habitation, and no apparent background, until on opening the river Ramos, the receding plain and its thick forests are perceptible. No columns of smoke are to be seen by day, nor fires by night, to give animation to its gloomy and forbidding aspect; an aspect, however, which is quite in keeping with the character of its treacherous and murderous inhabitants.* From the south entrance point of Forcados river the coast trends S. ½ W. for a distance of 13 miles to the entrance of Ramos river.

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* *See* Admiralty chart.—Africa, West coast, Sheet XVIII., Forcados river to cape Formoso, No. 1863.

RAMOS RIVER.—The outlet of this river is but half a mile wide between its entrance points, which are well defined; a dome-shaped tree appears in the background between them when bearing E. by S. ½ S., which mark leads into the very limited channel over the bar. From the northern entrance point a sward and sandy spit, named Murder spit, extends a mile seaward, and a village stands near the high-water mark at three quarters of a mile within the south entrance point. Should it be necessary to visit this river, the bar will be found most tranquil in the dry season.

Bar.—A belt of heavy breakers extends 2½ miles from the shore in front of Ramos river, leaving occasionally in the middle a smooth space of a third of a mile in width. This part of the bar is a mile across, with 9 feet on it at low water, and therefore subject to a dangerous scend of the swell. Inside the entrance points the estuary has straight sides which are steep-to for 2 miles, with 3, 5, and 7 fathoms smooth water. The bar may be crossed in the best water, and the first reach passed through, by bringing the dome tree to appear in the centre of the opening, and steering for it on the bearing of E. by S. ½ S.

Anchorage.—The best anchorage outside the bar will be also found with the entrance bearing E. by S. ½ S. in 5 fathoms, black mud, at 3 miles off the bar and 5 miles from the river's mouth.

Dodo river.—From Ramos river the coast maintains the same appearance, and the same general trend of S. ½ W. for a distance of 18 miles, where another river issues through an oblique opening with an island in its mouth. This river, known as the Dodo, is only three quarters of a mile wide in its lower reach, though the opening in the shore at its mouth appears to be nearly 3 miles broad.

Walker island, occupies the southern portion of the opening, and is thickly wooded at its eastern angle. All access for vessels to Dodo river is apparently prevented by the shoals which extend 3 miles north and south of this island, and 1½ miles to seaward.

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* In Ramos river, in April 1846, H.M.S. *Avon* lost two most zealous and promising young officers, Henry Pennington and Oziah A. Winstanley, who were there surprised and barbarously murdered.

Boat entrance.—Should, however, any object lead to a boat expedition into this uninviting place, an opening in the breakers may be sought in the dry season close over on the northern side, where there is a channel one third of a mile wide and 8 feet deep, found by bringing the lower reach of the river open to the northward of Walker island, on the bearing of S.S.E. ¼ E.; wait, however, for the last hour of the flood at spring tides, and look out also for the bar rollers, when approaching a low point which projects half a mile in a westerly direction from the northern elbow of the entrance.

Caution.—Keep a good look-out for the troublesome and dangerous natives, who can, like those in Ramos river, launch out from the creeks in large numbers, armed with rifles, cane-knives, and hatchets; their pretence for coming being at first to offer dried fish for sale.

Tides.—It is high water, full and change, in Dodo river at 4h. 17m.; springs rise 5 feet.

Anchorage.—Anchorage may be obtained in 4 fathoms, black mud, with a distant arched tree in line with the northern extremity of the trees on Walker island, bearing E.S.E.

The 5-fathoms flat extends 2½ miles west of Walker island, and 1½ miles outside the bar breakers. The discoloured waters of this river, like those of the Ramos, are seen when 7 miles in the offing.

Current.—The ebb stream sets north from the bar and the flood south; the outside current generally sets south at about a knot an hour.

Soundings.—The 100-fathom edge of the bank is 26 miles off shore in a westerly direction from the entrance to Ramos river.

Pennington river.—From Dodo river southward, the coast is of the same featureless character, but bends nearly two points more to the eastward.

The depth of 5 fathoms is found at a distance 3¼ miles off shore, as far as a small opening, named Pennington river. This streams opens to view on a S.E. by E. bearing, and is a third of a mile wide, with 6 fathoms water when a mile within the entrance points, but has only 6 feet upon the bar, which extends over an area of 1½ miles. A narrow passage, between heavy and dangerous breakers, will be found by keeping the entrance upon the above bearing.

Middleton river. * — From Pennington river the coast trends S. by E. ½ E. for a distance of 14 miles to the river Middleton, which from the offing has the appearance of a wide-mouthed estuary, with an island at its entrance (Miller island), leaving channels of equal breadth on either side. The southern opening is not a navigable channel, and is named False entrance.

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* Mr. A. MacEächen, F.R.G.S., 1873.

The main entrance lies between George island and Miller island, a distance of nearly a mile, though the navigable part of the channel is narrowed by a spit extending half a mile from the north extreme of Miller island.

From George island a narrow curved spit extends 2½ miles to the southward, between which and the bank extending from the south side of Miller island, there is a channel, about a third of a mile wide, and in which the least depth is 2½ fathoms.

On the north side of the entrance, at about 1¼ miles east of George island, is situated an English factory.

Miller island is separated from the mainland by a narrow 3-fathom channel, which connects the main and false entrances to Middleton river; a shoal spit connects Miller island south extreme with the south entrance point of False entrance (South point).

Directions.—A vessel approaching from the westward should keep in not less than 5 fathoms water, until South point bears East, when it may be steered for on that bearing; when the depth is reduced to 3 fathoms, alter course to N. ¼ W. for 1½ miles, steering for North point. This will lead between the shoals, which extend south of George and Miller islands.

When Miller island south extreme bears E. by S. ½ S., steer for the centre of George island, until Lobia point (the next east of the factory), is in line with Factory point, which latter mark will lead to the anchorage.

The western edge of the bank, south of Miller island, does not always break.

Tides.—It is high water, full and change, in Middleton river at 4h. 15m.; springs rise 5 feet.

Soundings.—A flat, with muddy bottom, extends 3 miles off the mainland, and the depth of 5 fathoms is found at 1½ miles outside the bar; the 100-fathom edge of the bank of soundings is 30 miles off shore, and the discoloured water from the river is met when about 4 miles to seaward.

Blind creek.—At 3 miles south-east of False entrance, there is another inaccessible opening, named Blind creek, one fourth of a mile in width, and from which breakers extend nearly a mile seaward.

Winstanley outfalls.—From Blind creek the coast line trends a little more easterly, with a mangrove covered shore, and similar quality of soundings, until, at 7 miles distance, on the bearing of S.E. by S. two apparent river entrances, known as the Winstanley outfalls, appear. They are a mile apart, and both barred by heavy breakers, which are occasioned by the stream from the rivers meeting with the ocean swell; discoloured water extends over a range of 4 miles seaward of the entrance to Winstanley outfalls.

Sengana branch.—A similar mangrove covered shore extends S.E. ½ S., for a distance of 8 miles from Winstanley eastern outfall to the Sengana branch of the Niger. The Sengana is, however, so obstructed at its entrance by a sand-bank in the centre, and by the turbulent breakers which extend a mile seaward, that although presenting a rather inviting appearance at first sight, it is not accessible. By patiently watching for a favourable opportunity, landing may be effected on the outer beach, just to the northward of the northern entrance point, and by crossing the point, a view of a tranquil sheet of water within was obtained; but the apparent disposition of the natives would have rendered any further examination of the place, at the time of the Admiralty survey, imprudent.

Soundings.—The depth of 5 fathoms is found at a distance of 4 miles seaward from the entrance to Sengana branch, the discoloured water from which extends about that distance from the shore.

NIGER RIVER.[*]—At 6 miles S.E. ½ E. from Sengana branch, 110 miles from the entrance of Benin river, and 319 miles on the bearing of S.E. ¾ E. from cape St. Paul, is situated the principal mouth of Niger Quorra, or Kwara river; it is known as the Nun entrance.

To vessels of 6 to 7 feet draught the Niger is navigable as far as Egga (340 miles within the entrance) with ease during August, September and October, and with but little risk as far as Onitsha, about 160 miles from the entrance, during July and November also. Vessels of 10 feet draught can proceed to Egga from middle of August to middle of October.[†] The river commences to rise during the first week in August, and begins to fall about the middle of October, but the exact date or extent of its rise cannot be predicted with certainty.

The river is generally lowest in April, and the average range between the dry and wet season is about 24 feet, with occasionally an extreme range of 40 feet.

At the end of August 1877 the river had risen nearly 30 feet, the banks in some places were 3 feet above water, in others nearly awash; the first rising ground was seen at Onitsha.

Between Louis creek, situated 6¼ miles north of the east entrance point, and Oguburi river (which joins the Niger on the western side at 42 miles above Trotter point), the channel, although narrow, and in some places obstructed by islands, does not appear so liable to change nor so difficult to navigate as that part above Oguburi river.

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[*] *See* Admiralty charts:—Kwara and Binueh or Chadda rivers, No. 2,446; Kwara river to Rabba, No. 621; and Kwara river on 9 sheets, Nos. 2,776*a*. to 2,776*i*.

[†] H.M.S. *Investigator*, drawing 5 feet water, in September 1862, proceeded as far as Rabba, a distance of 115 miles above Egga, or a total distance of 455 miles from the bar.

At Ndoni, on the eastern side of the river, 114 miles above Trotter point, there are three factories built on the south side of a creek, off which a hulk is moored.

The northern town of Alenso, situated on the western side of the river, 30 miles above Ndoni, has in it a number of houses with iron roofs.

At Onitsha, lying on the eastern side of the river, 12 miles above Alenso, a vessel should anchor nearly abreast the landing shed and westward of a line joining two cotton trees, situated north and south-west of the landing place.

At a distance of 105 miles above Onitsha the Niger is joined by the stream of Chadda, or Binueh river, which enters it on the eastern side, opposite the town of Lukoja.

Between Onitsha and Egga, a distance of 180 miles, the navigation is difficult, the channel being obstructed by rocks and the current running swiftly.

At a distance of 52 miles above Egga the Niger is joined by Kudùna or Lafun river.

In the rocky region between Ida (about 220 miles above the bar and Lukoja 45 miles farther north), the existence of several dangers has been reported, and it should be remembered that from the annual changes in the bed of the Niger, the chart of one year is frequently useless for another.

The breadth of the Niger in August 1877 as far as Augiama (38 miles within the entrance) was about 150 or 200 yards; above this it increased in width, being fully a mile across in some places; at Onitsha the width was about 1,200 yards, with deep water on the eastern side of the channel.

Entrance.—Nun entrance lies between cape Nun and Palm point, the former bearing from the latter N.N.W. ¼ W. distant 1⅓ miles. The shores on both sides are thickly wooded, and are so nearly upon the level of the river as to form a vast pestilential swamp.

Palm point, the eastern entrance point, is low and densely wooded. A native village and mission house stand on the margin of the eastern shore, 1⅓ miles north of Palm point, and the chief's village, Akassa, is situated half a mile inland of that village.

Trotter point.—This point, lying on the eastern side of the channel, N. by E. ½ E. distant 3 miles from Palm point, is low with a remarkable clump of high trees not far from its extremity, and a large white factory half a mile south of it, visible in clear weather when in 6 fathoms water outside the bar.

At Trotter point is situated the coal depôt of the West African steamship company.

Baracoon point, lying N.N.E. distant 2 miles from cape Nun, has on its northern side three factories and a hulk on shore; off the point a buoy is moored in 4 fathoms, near which vessels should anchor ; there is a small coal depôt here for the use of the river steam vessels.

Channel.—At Baracoon point the channel is three-quarters of a mile wide, and above that point it expands considerably in width for a distance of 3 miles, when it again becomes contracted.

The only available channels for vessels proceeding above Baracoon point are through Alburkah channel (which is entered immediately north of Baracoon point) and Louis creek, situated on the western side of the river, 6½ miles north of Palm point.

Akassa creek, affording communication with Brass river, and available for vessels drawing 7 feet water, is entered on the eastern side of the channel, 3 miles above Baracoon point.

Alburkah channel carries deep water, but its numerous sharp turnings prevent its being used when descending the river ; H.M.S. *Ariel* drawing 10½ feet, passed through Alburkah channel in August 1876.

Louis creek.—In Louis creek the least water found in August 1877 was 10 feet ; it is recommended when proceeding down the river to pass through this narrow channel during the flood stream, as the ebb runs strongly.

Bar.—Breakers extend from the west point of entrance to Niger river in a S.S.W. direction, almost at right angles to the coast line, and then curving sharply to the eastward, form a belt of sands and breakers half a mile in breadth, on which there is generally a depth of 10 feet at low-water ordinary springs.

The Niger expedition of August 1877, consisting of H.M. vessels *Avon*, *Boxer*, and *Pioneer*, crossed the bar of the Nun entrance with the factory on Trotter point, about six of its own lengths open west of Palm point, bearing N. by E. ½ E., and found on it a depth of 15 feet at three quarters flood.*

When the leading marks are not visible the lee breakers afford a sufficient guide for crossing, unless the sea be very smooth, when boats should be moored to show the edges of the banks.

No native pilots are to be obtained, but vessels of war usually avail themselves of the services of masters of vessels trading in the river.

Outer anchorage.—A prudent distance to anchor off the Nun entrance is 3 miles from the bar, on the leading mark, in 7 fathoms.

This anchorage is very disagreeable, owing to the heavy swell, to which vessels generally lie broadside on, in consequence of the easterly current.

To enter.—By carefully watching the tide it will be easy to select the most favourable moment for entering this river ; but it should be recollected that even at the driest and best season, a heavy swell undulates, if not actually breaks, upon the bar. When across, borrow towards the eastern shore to avoid the spit which extends about a mile south-east from cape Nun. After passing Palm point a smooth reach of a mile wide, with a depth of 5, 6, and 7 fathoms in it, extends for 3 miles to Trotter point, with 4 fathoms within 2 cables of its eastern shore.

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* Remark books, H.M. ships *Avon*, *Boxer*, and *Pioneer*, 1877.

Anchorage may be obtained in 5 fathoms, sand and mud, off the mission house on Trotter point.

Tides.—It is high water, full and change, in the Nun entrance at 4h. 8m.; springs rise 6 feet. The ebb stream runs 9⅓ hours at the rate of 3 knots an hour, and the flood for 3 hours at 2 knots an hour.

The tidal influence appeared to extend about 25 miles within the entrance. Off Taylor creek (60 miles up the river), the downward current in August 1877 was found running about 3 or 4 knots, and at Onitsha 3½ knots an hour.

Wreck.—The wreck of an iron vessel sunk in 1873 lies in 5¼ fathoms, bearing S.S.E., distant about 4 miles from Palm point. The only remaining mast of the wreck is barely discernible at high water, and consequently is dangerous to vessels, especially to strangers, leading them into the belief that it is a buoy off Brass river entrance.

Trade.—The trade on the Niger river appears to be rapidly increasing; below Onitsha the chief export is palm oil, and above it ivory.

Six steam vessels and three steam launches find constant employment on this river.

Soundings. — The discoloured water from Niger river extends 4 miles outside the bar, and the 100-fathom line lies 33 miles off shore; a depth of 23 fathoms, fine dark sand, will be found when 16 miles south-west of the bar.

CHAPTER XIII.

GERERAL REMARKS ON THE BIGHT OF BENIN.

VARIATION in 1880.

Lagos - - - 18° 00′ W.

Limits.—The bight of Benin is embraced between cape St. Paul and cape Formoso, which latter bears from the former S.E. ¾ E., distant 340 miles. From that line, at two thirds of the distance from cape St. Paul, the curve of the shore recedes 95 miles to the north-eastward, where, at the head of the bight, is situated the village of Odi.

The length of coast of the bight is about 450 miles, forming a long monotonous range of beach, so uniformly low and flat that not a single inland eminence is visible from the offing; indeed the elevation of the ground above the sea in some places is scarcely four feet, and seldom exceeds ten, and even the most prominent clumps of trees do not rise to a height of more than 60 feet.

Character of coast—The coast from cape St. Paul to cape Formoso is composed of sand and mud; sand of a bright yellow tint along the western two thirds of the interval, and sand and mud along the eastern side of the bight, as well as on the margin of the estuaries of the numerous rivers. Whatever gentle undulations may be discerned on the shore, they will prove to be only sandhills thinly covered with a loamy crust, and densely clothed with weeds and brushwood; no part of them is more than 10 feet above low water or 5 feet above high water. Here and there single palms and cocoa-nut trees gracefully rise from the edge of the high-water mark, or a group of huts with their white conical roofs stands out in relief to the dense thicket or jungle background, while, on the receding plain, clusters of stately trees, when seen from the distance of 5 or 6 miles, present the appearance of green cliffs.

Near Quitta the trees are high and form large and distinct groups, gradually blending into a continuous line as far as Ahgwey, where the coast trees terminate, and the high beach is only occasionally dotted with them; between Great Popo and Whydah the beach is very bare, only occasionally rising into green hummocks.*

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* Navigating sub-lieutenant C. E. Pritchard, H.M.S. *Ariel*, 1876.

Little Popo has extensive groups of palm trees at its *western* extremity and hardly any at the *eastern* part.

Great Popo has extensive groups at its *eastern* and very few at its *western* part.

Whydah has no conspicuous clumps of palm trees near the town.*

From an offing of 12 miles, when seen from an elevation of 13 feet, the whole scene dips below the horizon; so that, in fact, throughout the bight of Benin, there is no object which at that distance from the shore would enable a vessel to reach in to any particular station, or identify any one position. At 8 miles from the shore the aspect is entirely different from that at 4 miles, so that until familiarized with the appearance of every place, one station can be recognized only by tracking it from another, assisted by the Admiralty chart.

Windward or western arm.—Jungle, with groups of trees, covers the whole of the windward or westward arm of the bight, but it is interspersed with numerous villages and detached huts; throughout this long extent of coast there is but one permanent opening or outfall for the lagoon waters (Lagos river), but there are several partial breaks in the sandhills, through which the lagoons pour their swollen floods during the wet season; these breaks produce straight vistas, which appear like river openings, but across them the sand is heaped so compactly as to preclude any outfall during the rest of the year.

Leeward or south-eastern arm.—The distinctive character of the leeward or south-eastern arm of the bight is a continuous dense mass of trees, no longer fringed by a bright sandy beach, but growing on the muddy high-water margin of the sea; the many rivers and creeks which cross the Delta of the Niger river are also a peculiar feature of this arm. On this part of the coast there are very few groups of huts, or remarkable objects by which a vessel may identify her position; but it contains thirteen of those river mouths, each possessing sufficient diversity of feature to be recognized. Much vegetable matter and silt is discharged from these at every ebb tide, which discolour the blue ocean water with a filthy scum of a brown colour and sickening odour, for the distance of several miles from the coast.

Soundings.—The soundings along the windward portion of the bight may be classed in the following zones:—at one mile from the beach there is a depth of eight fathoms, fine light-brown sand, extending as far eastward as Palma village; at a distance of 3 miles from the coast a depth of 10 fathoms is found with similar bottom; and at 6 miles from the beach, 12 fathoms over a similar description of sand. At that latter distance from the shore the sandy bottom changes into olive-coloured and black mud with broken shells, and the water rapidly deepens to 200 fathoms at the edge of the bank, which, though only 7 miles south of cape St. Paul, lies 18 miles from the shore on the meridian of Lagos.

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* Lieutenant J. St. C. Bower, H.M.S. *Danae*, 1878.

The average width of the bank of soundings to the 100-fathom line is about 15 miles along the Windward arm.

The unceasing deposit from the scum, poured out from the numerous rivers on the south-eastern arm of the bight, accounts for the much increased breadth of the bank of soundings, the 100-fathom line being found at an average distance of about 30 miles from the coast.

This broad bank of soundings affords a useful warning to the mariner when approaching the south-east part of the bight, which is skirted with muddy shallows to such a distance, that the surf on the coast is not heard when in shoal water ; along the western arm a vessel may stand in to 6 fathoms, or a third of a mile from the beach.

Caution.—Even in the western arm, however, the lead should always assist the look-out, or the navigator might unexpectedly find his vessel within the influence of the coast swell and rollers, the action of which is sometimes experienced when three-quarters of a mile from the beach. The tendency of the swell to set a vessel to leeward should be allowed for at the rate of half a knot an hour, when shaping courses at night, or in hazy weather by day. Even steam vessels ought not to shoal the soundings below 8 fathoms when on the windward part of the bight, for unless their engines are occasionally stopped, the roar of the surf will not be heard in time, though audible long before the foam can be seen in foggy weather. If there be no particular motive for hugging the shore at night along the windward coast, the best rule for preserving a 4 or 5 miles offing is to keep in 12 fathoms.

Anchorage.—Excellent holding ground is afforded throughout the whole of the bight of Benin, from close in-shore out to a depth of 15 fathoms, which will be found at about 7 miles off the windward coast, and 12 miles from the leeward coast. The bottom is throughout of stiff black mud with broken shells covered by sand, and is well adapted for working the stream anchor with a bower cable, as the stream chain might not sustain the strain of the irregular swell, which occasionally, assumes the form of rollers. Outside the depth of 15 and 20 fathoms, the bottom is composed of so soft a compound of olive-coloured mud, broken shells, and decayed vegetable matter, as to require a bower anchor. In-shore, although the lead arming may indicate nothing but sand (which covers the bottom to the depth of a few inches), yet from cape St. Paul to Avons deep, the anchor will instantly bury itself up to the crown in mud.

Off-shore anchorage.—Anchoring anywhere in the bight of Benin must be prompted by necessity and not from any hope of tranquility; for as the vessel lies more or less obliquely to the swell, according to the strength of the current, so unceasing heavy rolling is the sure result. If requisite, however, for the purposes of transporting stores between vessels, choose a 12-miles offing at least; and, if consistent with the purpose in view, select the windward arm of the bight, and as far westward towards cape St Paul as possible, for the swell there is not so heavy, and the climate is less disagreeable than it is when farther eastward. In fact, several dry sunny days together, during the rainy season, may be enjoyed to the westward of Lagos, while it is incessantly raining to leeward.

Directions for anchoring.—Along the leeward arm of the bight a vessel should anchor at 9 miles off the coast in from 10 to 12 fathoms, not only to avoid shoal water, but also on account of the heavy ground swell that is perpetually rolling in; if the land be not visible, and if with the vessel's head off shore the soundings are decreasing below 12 fathoms, it will be advisable to anchor; more especially if supposed to be opposite any of the river entrances, as the indraught of the flood tide extends 4 or 5 miles from the shore.

Winds.—The prevailing winds in the bight of Benin are from S.W. and West; and the current along the western part of the bight sets to the eastward with a velocity varying from half a knot to 2 knots an hour, so that both tend to sweep a vessel towards its south-eastern shore.*

Amid the anxieties of the commander of a vessel in such an unhealthy climate, and on such an inhospitable coast, without a lighthouse or a single harbour of refuge, it will be no small relief to know that throughout the bight of Benin there does not exist an offlying shoal of any description, and that lasting gales of wind do not occur. A vessel has only to be kept clear of the actual beach on the windward side of the bight, and off the river bars on the leeward side, which common vigilance can ensure.

TORNADOES.—A vessel should be prepared for the tornadoes which periodically will assail her with more or less fury, and which otherwise may dismast or throw her on her beam ends. These squalls, however, give ample warning of approach; they are of brief duration, and generally blow off shore; they may take place at any period of the day or night from the beginning of March to the end of June, also during October and November. Thunder precedes the gathering arch of clouds, which darkens the horizon in the direction from whence the burst of wind and rain will come.

They generally commence from the S.E. and draw round through east to N.E.; but this is by no means certain, as they have been experienced blowing right on shore. They have been known to begin at East and draw round to South, and they have also been experienced from the westward. When the sea breeze is strongest, the tornadoes are found to be most violent. Hard squalls from the S.E. are also occasionally encountered, which have not the characteristics of the tornado, (the black arch and vivid lightning gathering to leeward), but are not the less dangerous. At Quitta the tornado often blows so as to make it a lee shore.

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* In June, 1878, H.M.S. *Danae*, when crossing the bight from cape Formoso to cape Coast Castle, experienced an indraught of three-quarters of a knot an hour.

Barometer.—The barometer gives no indication of an approaching tornado, and maintains its uniform quiescent state, which in this region varies but a tenth above or below a height of 30 inches throughout the year ; but the thermometer quickly falls 5° as the tornado approaches, and continues to indicate its cooling effects for some hours after.

Indications of approach.—The tornado begins by agitating the surface of the sea at a distance, so as to be seen by day, or heard by night ; rain sometimes accompanies the first furious burst, and is driven with such force, as to render it impossible to look to windward, or discern anything beyond a few yards' distance, and its noise so overcomes the loudest voice, that all orders necessary to meet the exigency must be conveyed by messengers.

Sanitary precautions.—It is important to health that all those who must keep on deck during a tornado should be in blanket dress ; for, notwithstanding a high temperature, the rain numbs the limbs at the time, and a chill follows. If stoves could be lighted below for a couple of hours after each tornado, and on every day during the rainy season, it would conduce much to general health.

Under sail.—In order to meet the first burst of a severe tornado, it is in general prudent to bear up from the indicated quarter—to furl all sails, including awnings, strike top-gallant masts, bar in ports and scuttles, and hoist the fore-staysail, for it is essential that the vessel should not receive the first burst on her broadside.

At anchor.—If at anchor (the best condition in which to receive a tornado), furl awnings until the wind has expended itself, and keep the fore-staysail ready, to cast the vessel in case of parting ; then loose and slope awnings directly the wind ceases, in order to carry the succeeding deluge of rain to the water-ways. During this lull, and while the wind is resuming its usual moderate force (a period sometimes of three hours), the perpendicular stream of rain is attended by rapid peals of crashing thunder, with scarcely an interval between them, and by vivid forked lightning which seems to proceed from all quarters at once.

Rainy Season.—In April and May tornadoes may be expected at intervals of 48 hours, and twice sometimes on the same day. In June and July they occur almost daily or nightly, but are not accompanied by such violent wind; in August and September, the weather resolves itself into almost continuous rain, with strong sea breezes and heavy swell from the south-west. Occasionally, however, in the western arm of the bight during June, July, and August there is scarcely any rain, and but few squalls.

The coolest month of the year is June, when also strong breezes prevail from the south-west, with the thermometer occasionally down to 77° F.

Dry season.—In October the weather gradually clears up, leaving November, December, January, and February the most settled and healthy months of the year. During these four months, the temperature in the shade scarcely varies by night or day, above or below the limits of 85° and 90° F.

Caution.—Exposure to the sun's rays between 10 a.m. and 3 p.m. should be studiously avoided, and sleeping exposed to the night dews is dangerous; therefore, whenever practicable, awning shelter should be provided for the crew throughout the 24 hours.

Working to windward.—In working to windward in the bight of Benin it is advisable to stand off on the starboard tack during the day, and in-shore on the port tack by night, tacking should the wind veer towards the west.

Smokes.—The land is frequently obscured by exhalations, locally termed smokes, which in the dry season, especially from November to May, prevail throughout the entire bight, but with less perplexing effects on the windward coast, where the bright sandy beach, with its fringe of surf, is easily seen through the haze, or the breakers are heard in time to warn the mariner of his proximity to the shore.

The smokes last usually for about three hours after sunrise, giving place at about 10 a.m. to the sea breeze.

Tides.—The beach indicates a vertical range of tide of about 4 or 5 feet, but the surf was so heavy and incessant on the shore, and the swell so constant in the offing, that it precluded actual measurement of the rise of the tides on the windward coast; along the leeward arm, where the water is smooth within the bars, the tidal establishment at each river mouth has been obtained. The navigator should therefore compute when to allow for the influence of either ebb or flood streams, which generally extends to a radius of 6 to 9 miles from the mouth of those rivers; more especially if intending to send a boat across any of the bars.

The velocity of the flood stream is much less than that of the ebb, as might naturally be expected from the vast outfalls of the freshes being added to the discharge of tidal water, the combined effects of which are expended over a considerable radius, with a velocity of 3 knots an hour at the mouth of a river, and one knot an hour in the offing; at half ebb a volume of turbid, brownish water, upon which are floating up-rooted trees, bushes, leaves, and jungle is discharged.

Current.—With the exception of the tidal influence off the opening of Lagos, there is only the current to affect a vessel when proceeding east or west along the western division of the bight, and the velocity of that varies from 12 to 48 miles per day. This current rounds cape S. Paul and sets to the north-east, parallel to the coast line for about 25 miles ; it then gradually assumes the E.S.E. trend of the shore for the next 180 miles until abreast of the termination of sandy beach near Odi, and under ordinary circumstances, except during the harmattan season, without any in-shore eddy. From March to June this easterly current brings loose patches of that remarkable and only sea-weed seen in the bight, known as sargasso or gulf-weed (*Fucus natans*), and which are seen at intervals of 8, 10, and 12 miles. Its delicate stalks, currant-sized leaves, and light brown berries may be seen in parallel lines drifting from the south-west, the patches averaging 1½ miles long by a quarter of a mile wide, they extend to within 25 miles of the shore, and are seen as far to leeward as Lagos.

Caution.—During the harmattan season (December to January), the current in shore occasionally sets to the westward with a velocity of about one knot an hour; and even during the prevalence of westerly winds, when they have been blowing freshly up for three or four days, and thus pressed a superabundance of ocean water against the leeward arm of the bight, a reaction takes place, and a westerly current will be produced lasting for 12 and sometimes 24 hours. In such circumstances, if a cruiser be intent on keeping her position at night, it will be prudent to drop a boat in order to ascertain the direction of the surface current, and always to make a free use of the stream anchor.

Attention to these fluctuations in the set of the current is especially necessary along the leeward arm of the bight, when within the influence of the river tides, or when in less than 12 fathoms water.

Discoloured water.—Frequently the discharge from the rivers on the leeward coast consists of a scum nearly 3 feet deep, resembling the lees of an oil cask, and from its deep brown colour, so contrasts with the ocean blue as to present a remarkably defined and frothy margin, presenting all the appearance of a shoal. On approaching it a stranger would be much inclined to tack or anchor ; but if the soundings be attended to, he will be saved much unnecessary trouble, and when crossing its edge he will find that, though its onward motion would sweep away a boat, it has no effect on a vessel of moderate draught.

Lagoon outfalls.—This discoloration of water, during the rainy season, extends sometimes as far westward as Jackin and Whydah, and to a distance of 10 miles from the shore ; while in-shore the outfall of the lagoons give the sea a light-green tint. This lagoon water breaks out through openings in the beach during the rainy season, beginning with the month of April, and so continuing throughout the rainy season until October. These outfalls from Great Popo to the eastward are all, except the permanent opening of Lagos, barred by sand between October and April, leaving no other indication of their positions than the remarkable vistas through the wooded belt which lines the shore. In no case, however, do they afford accessible channels into the lagoons, for when most charged with water they only increase the usually dangerous surf; and when the freshes decrease, the sea completely replaces the sandy beach.

Temperature of sea.—The temperature of the sea is generally within a degree, more or less, of that of the air for the first 10 or 15 fathoms of depth, but at 20 fathoms below the surface it is cooled 2°, at 30 fathoms 10°, at 40 fathoms 17°, at 50 fathoms 20°, and at 100 fathoms it is 25° less than that of the surface.

LAGOONS.—On the windward arm of the bight narrow lagoons extend parallel with the shore throughout nearly the whole extent from cape St. Paul to Lagos river. The average distance of these lagoons from the coast is about a mile, and on their northern sides are built several trading ports with landing places on the sea coast.

These inland waters afford ready communication between the extensive and comparatively little known lakes or lagoons named Avon waters, Denham waters, Porto Novo lagoon, Lagos lagoon and Cradu water. The shores of these lakes are thickly inhabited and produce abundantly palm oil, indigo, &c.

Lagos lagoon extends about 10 miles in a N.N.E. direction from Lagos island, where it terminates in a bay (Ikoradu bay) which receives the waters of the river Ogun or Abbeokùta.

Cradu water.—At the distance of 9 miles E.N.E. from Lagos island, a narrow channel, obstructed by Palaver islands, connects Lagos lagoon with Cradu water, which is a long narrow lagoon extending 27 miles eastward from Palaver islands to the native town of Epè, situated on its northern shore.

In February 1864, H.M.S. *Investigator*, drawing 5 feet water, proceeded from Lagos to Epè, finding a depth of only 5 feet in the narrow channel off Palaver islands.

Cradu water receives the waters of two extensive rivers, the western known as Abbeokuta river, affording communication with an extensive native town of the same name; the eastern is named Oshun river. At the junction of Oshun river with the lagoon there is a branch said to communicate with Benin river.

Abbeokúta river has been examined for a distance of 32 miles in a direct line from its junction with Cradu water to the town of Aro. The breadth of the river varies from 30 to 100 yards, and the banks are generally low.

At Aro, in November, the depth in the channel was 2 feet, and at 8 miles above that town the river even in the wet season becomes impassable.

A rapid downward current was experienced in the river, which is only navigable by boats.

The town of Abbeokúta is situated about 4 miles N.N.E. from Aro.

Victoria lagoon.—The Victoria lagoon, for a distance of 9 miles west from its junction with Lagos river, has a general depth of from 12 to 20 feet; westward of this the channel is narrow and intricate for a distance of 7 miles, but after passing these narrows the bottom is clean in the centre, with an uniform depth of 10 to 30 feet up to the town of Porto Novo. West of the narrows the water is perfectly fresh, but not wholesome. Fish abound, mullet frequently weighing 3 or 4 pounds; oysters and other shell fish are excellent and plentiful.

A vessel drawing 9 feet may generally reach Badagry from Lagos through the lagoon, which is a quarter of a mile wide at Badagry and 16 feet deep; the intervening ridge of sand between it and the beach is about two-thirds of a mile across.

Westward of Badagry the lagoon on its northern side receives the waters of Zeawa and Gidy rivers.*

Off Badagry, in the wet season, the current occasionally attains a velocity of 2½ knots an hour, being influenced in direction by the wind.

Porto Novo lagoon.—Westward of the entrance to Gidy river the lagoon expands in width to about 1¼ miles, and is known as Porto Novo lagoon, from the extensive native town, containing a population of about 10,000, situated on its northern side.

The shores of this lagoon are low and uniform in appearance, being composed of bog and floating grass closely matted together; the trees in the vicinity of the shores are generally small.

Toche channel.—At about 2½ miles south-west of Porto Novo is situated the entrance to Opara or Whemi river, immediately south of which the lagoon contracts in width and forms Toche channel, a narrow strait communicating with Denham waters.

In December 1876 there was only a depth of 3 feet in Toche channel, and a tidal rise of 6 inches was observed; during December the water in the lagoons is generally lower than at any other season.

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* *See* Admiralty charts:—Badagry to cape Formoso, No. 2768*a*; Cape Coast Castle to Badagry, No. 2768*b*; Inland water communication between Lagos, Badagry, and Porto Novo, Nos. 445*a* and 445*b*: Also Admiralty plan:—Ogun or Abbeokúta river, No 143, scale, *m* = 1·6 inches.

Denham waters.—Westward of Toche channel the lagoon expands considerably in breadth and increases in depth. This part of these inland waters is known as Denham waters.

Numerous towns, built on piles, are situated on this lagoon, which in September 1876 had a general depth in it of from 8 to 10 feet.

The river Ezu or Isos enters the lagoon at its northern extremity; this river, which joins the Opara at 12 miles from its mouth, is only navigable by canoes.

At the south-western part of Denham waters is situated a shoal creek, leading to the native town of Cutunu.

Whemi or Opara river.—This stream, which affords water communication between Lagos and the landing place for Abomey, the capital of Dahomey, was found to have a depth of from 5 to 12 feet in it (in December 1876) between Porto Novo lagoon and the town of Kesamu situated 18 miles north of it; at Kesamu the river was about 125 yards wide and no current was perceptible.

In September 1876, the Colonial steam vessel *Eko*, drawing 4½ feet, ascended Opara river as far as Dugha, a distance of 55 miles from Porto Novo lagoon and 23 miles south-east of Abomey. The downward current at this season was found to be very strong.

It is estimated that the difference of level of Opara river between wet and dry seasons is from 6 to 8 feet.*

Avon waters is the name of an extensive lagoon lying north of Porto Seguro; it is also locally known as Hacco lagoon, and is said to form a junction with Volta river at a considerable distance inland.

Between Porto Seguro and Jackin a narrow lagoon extends for about 50 miles, being separated from the coast by a narrow sandy ridge; several streams fall into this lagoon on the northern side, and it has a permanent outlet lying eastward of Grand Popo.

The depth in this lagoon during the dry season is only about 2 feet, but in the rainy season it increases to several fathoms.

Landing.—It should be borne in mind that, however practicable the surf may occasionally appear, nothing ought to induce an attempt to land anywhere between cape St. Paul and the termination of sandy beach at Odi, in other than local canoes, and even they require much skill in handling and the assistance of extra hands to receive and haul them up as well as to launch them. The signal gun, with ensign at the fore, will be at once understood by the natives as a signal for a canoe, though, perhaps, tardily obeyed.

Canoes.—The part of these canoes reserved for passengers is at their bow, where 3 or 4 feet of housing is formed to keep out the sea when thrusting through the surf in the operation of launching, and it affords the only chance of keeping anything dry. More than two persons cannot well occupy this limited space, and other passengers must sit on the thwarts between the double-banked paddlers, who themselves sit obliquely on the gunwale with their faces towards the bow. The padroon or coxswain steers with a paddle. In disembarking, the passenger may sit or stand in the fore port of the canoe, in order to be ready to jump on shore quickly, lest he be swept out by the succeeding surge.

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* Acting Administrator J. D. A. Dumaresq, Lagos, December 1876.

Embarking.—The canoe is made ready with her prow outwards, and hauled up her length on the beach, while the crew are ranged on either side, reaching down to the thwarts so as to lift her out of the sand-dock, as well as to launch her, which they begin to do with the assistance of the beach-men, as soon as the second of three heavy waves has broken. The steersman now watches with experienced eye for the following swell, when, with energetic exclamations and gestures, the canoe is floated off on the expended wave ; each man jumping into his place with his paddle, and so simultaneusly and expertly as not to overbalance her. The head is then dexterously kept to the sea, but the canoe is not propelled forward till the steersman again gives the word ; and sometimes a long interval is occupied in watching the swell and in moving a little backward, forward, or perhaps sideways, which is cleverly done by a sculling motion of the paddles without altering the direction of the head, which must be kept towards the surf. Many anxious minutes are passed in this way, till the state of the outer swell seems all at once to justify a dash, and then, with great urging at one moment and expertly checking at another, the buoyant little boat is passed from ridge to ridge.

It is always prudent to have the ship's boat waiting at the back of the surf, and it is advisible to head-up in a small cask such things as it may be desirable to pass dry through the surf.

Casualties.—Very few accidents occur to these canoes when freighted with passengers only, but with cargo they often capsize, especially when loaded with such top-weight as casks of palm oil and oxen, or when landing crates and dry goods in cases.

Trading posts.—The principal trading posts in the bight are Porto Seguro, Little Popo, Ahgwey, Whydah, and Badagry. On the leeward coast a few merchant vessels anchor outside the bar of Benin river where they sometimes wait for several months, treating for palm-oil, cask by cask, and patiently enduring the caprice and dilatory ways of the natives as well as the baneful exhalations of the adjacent jungles.

Watering.—It is not advisable for cruisers to obtain wood and water anywhere in the bight ; nor can there under ordinary circumstances be any occasion to do so, as Fernando Po and Princes islands are within 3 days sail to the southward. In cases of necessity, however, the natives will bring off water, and merchant vessels generally so provide themselves. With attention, an ample quantity of rain-water may be saved during two thirds of the year for cooking and washing purposes.

Currency.—The *cowrie* shell formerly was the usual currency, and is decidedly advantageous to the voyager in point of exchange, though heavy and bulky it is still universally employed inland, but the coast natives are now accustomed to the European money. The scale of valuation as understood by the natives is that 40 cowries of all sizes make one *string;* 50 strings are equal to one *head* (the common name for a dollar); 20 heads are equal to an ounce of gold dust, and an ounce of gold dust represents 4*l.* sterling. Thus a dollar is worth 2,000 shells, of which it would be most tedious to count any large number, if that were required by the natives; but on showing them that 2,000 average cowries weigh 5 lbs., they will take the rest by weight. They are fond of bartering in kind, and the cruiser will find ready exchange for empty bottles, &c. The average price of cowries in England is about 60*l.* per ton, and they realise fully 80*l.* on this coast.

Ornaments.—Cowries are employed by the natives for other purposes than money. They perforate the apex of the shell and string them like beads for bracelets, armlets, and necklaces, which are adopted by both sexes, and are connected with their mystic rites of *fetish.*

Supplies.—Abundance of stock, and a moderate supply of vegetables, can be obtained at several stations on the windward coast, viz., Awey, Jellah Coffee, Quitta, Elmina Chica, Little Popo, Whydah, and Badagry. The four first-named places are the most convenient, as the anchorage off them is generally smoother, owing to the vicinity of cape St. Paul, and the natives are generally more anxious to get rid of their stock than at the populous stations to the eastward; at Badagry abundant supplies can be procured when the surf admits of their being brought off to the vessel.

Excellent yams are to be obtained at Fernando Po, and, if whitewashed and stowed in a dry tank, will keep for a couple of months. Yams should be unsparingly allowed as a substitute for biscuit, which is speedily injured in this climate.

Fish.—The climate in the bight of Benin causes meat as well as fish to rapidly decompose, requiring them to be cooked or salted within three hours of being killed, and even salting is often unsuccessful; for this reason fish is not easily procured from the shore, though the lagoons produce carp and large prawns. The only fish that will take the hook, and that in uncertain and small quantities, is the sucking-fish (*Remora*), which is about the size of a dog-fish; numbers of these may be seen early in the morning, when at anchor, about 4 feet below the surface.

The bight of Benin is visited in January by great numbers of sea-blubber or medusæ; in May by the flying-fish; in June by porpoises, bonettas, and dolphins; in July and August by the black whale, generally in pairs; in August by young sharks, and sucking-fish then appear in greater abundance than during the other months. The full-grown voracious shark abounds at all seasons, and the other fishes above-mentioned do not actually restrict their visits to those specific periods, but they are then considerably more numerous than during other months of the year.

The animalcules which occasion the luminous appearance of the sea are equally prevalent throughout the year, but they are most remarkable during the dolphin season, darting in myriads obliquely from the sides of a vessel, and across her bows and wake; the trains of phosphoric light which they produce a few feet below the surface, appear then to be more than ordinarily brilliant.

Birds.—The sea-birds that frequent the bight of Benin are few in variety, and not more remarkable in one season than another. The common sea-gull is found in the openings of the rivers as well as in the offing; flocks of sea-plover and stray boobies are occasionally seen, and a few sea-swallows, or petrels, are ever skimming in the wake of a vessel. In June, a multitude of white-breasted birds of the crane species congregate on the flat muddy shore, which terminates the sandy coast near Odi, and are so numerous as to give it the appearance of being a white stony beach, until closely approached, when they simultaneously rise like a cloud, and discover to the startled spectator a black muddy strand.

Insects.—When lying within 3 miles of the windward shore of the bight, at night especially, the land breeze often brings off a few stray butterflies; mosquitoes, which are numerous on shore, do not infest vessels in the offing; cockroaches, ants, weevils, and occasionally centipedes, are generally numerous on board vessels employed in the bight.

Salt.—While running along the coast, at a distance of a mile or two, the natives may be seen carrying calabashes of sea-water from the beach to mounds raised above the ground, in which the water by exposure to the sun is evaporated, and salt obtained for curing the lagoon fish.

CHAPTER XIV.

CAPE FORMOSO TO RIVER CAMEROON—BIGHT OF BIAFRA.

VARIATION in 1880.

Cape Formoso	- 18° 10′ W.	Cameroon river	- 17° 40′ W,

CAPE FORMOSO,* the eastern limit of the bight of Benin, is also the western boundary of the bight of Biafra. The line of coast from it to Cameroon river, where the shore turns abruptly to the southward, trends E. by S. ½ S. nearly, for 170 miles, and is almost flat, appearing of a dark colour. It is intersected by several rivers, of which the more important are the Bonny, the New and Old Calabar, and the Rio del Rey. These are, however, generally difficult of access, each being obstructed by a bar at its outlet.

Cape Formoso, which is low and wooded, forms the extreme southern extension of the Delta of the Quorra, Kwára, or Niger river.

Tides.—It is high water, full and change, at cape Formoso at 4h. 8m.; springs rise about 6 feet.

BRASS RIVER.†—At 9 miles east of Palm point, and 4 miles east of cape Formoso, is situated the Rio Bento or St. John, more commonly known as the Brass river. Its entrance lies between two points which when bearing N.N.E. appear well defined, the trees on the western point being more rugged and lower than those on the eastern point; when bearing between North and N.N.W. an opening is seen in the trees on East point, having the appearance of an arch.

Within the entrance points the river expands in width to 1¼ miles, which it maintains for a distance of 2¼ miles in a N.N.E. and S.S.W. direction. On the eastern side the southern building is the mission house, situated about 3 cables north-east of East point; north-east of the mission house numerous factories are situated on the shore for a distance of about half a mile.

In 1838 the boats of H.M.S. *Viper* ascended Brass river for about 60 miles, and found it 400 yards wide and 9 or 10 fathoms deep, its banks fringed with impenetrable mangroves. On returning they kept along the western shore with a favourable current running 7 knots an hour.

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* *See* Admiralty chart:—Africa, West coast, Sheet xix., Cape Formoso to Fernando Po island, No. 1,357.

† *See* Admiralty plan:—Brass and St. Nicholas rivers, No. 146; scale, *m* = 1·5 inches.

East point, the eastern entrance point, is gradually being washed away by the current.

West point, the western entrance point, cannot be distinguished until a vessel is near it; this point is extending to the eastward.

Buoys.—A black fairway buoy lies in 5 fathoms, bearing S. ½ W., distant 5⅓ miles from East point.

A red buoy lies in 12 feet, 2 cables south-east of the tail of the western bar breakers; from it the fairway buoy bears S.W. ½ S., distant 2¼ miles. A black buoy, moored in 20 feet, lies S. ¾ W. from East point, distant 1½ miles; it marks the eastern limit of the channel between the bar and East point.

Caution.—The positions of these buoys cannot be depended upon. In June 1871 the red buoy was washed away, and subsequently recovered at Fernando Po.

Outer anchorage.—Vessels arriving off the Brass river should anchor in 6 fathoms, about one mile W.S.W. from the outer buoy.

From this anchorage neither houses nor shipping can be seen, and as the report of a gun is not readily heard at that distance from the shore, a vessel requiring a pilot must generally send a boat for one.

Should, however, the usual signals be recognised, a pilot will come off as soon as the bar is practicable.

Bar.—From West point a curved spit extends in a southerly direction for a distance of 2½ miles. From East point shoals also extend 4 miles, and between them is situated a bank which constantly breaks, locally known as Hartley bank. The main channel is situated eastward of this bank, and westward of it there is a narrow channel named the Swatchway, reported to carry a depth of 15 feet.

The best time to cross the bar is at half flood; vessels drawing over 12 feet must wait for the last of the flood, and if over 15 feet draught they should not attempt it, as the tidal streams run with great force, especially during the rainy season, when the ebb attains a velocity of 5½ knots an hour.

Both flood and ebb streams set strongly towards the eastern shoals; a vessel should therefore keep nearer the west side on entering.

A range of hills on the west side of Brass river, a few miles inland, terminates in a well-defined shoulder, which kept well open west of East point, and bearing N. by W. ¼ W. leads east of the red buoy and over the bar in 12 feet at low water; when the depth increases to 15 feet, steer N.W. ¼ N., and when the channel is fairly open, bearing N. by E. ½ E., steer in, passing west of the black buoy.*

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1876.

Ordinary boats cannot cross the bar of this river except in fine weather.*

Anchorage.—Vessels anchor in from 4 to 6 fathoms, mud, off the entrance to Tua creek, on the eastern side of the channel, three-quarters of a mile above East point.

Akassa creek is entered 1½ miles north of the west entrance point of Brass river, it affords communication between that river and the Niger, available for vessels of 7 feet draught, and is much used by merchant steam vessels trading on the Niger, as the bar of Brass river is more easy to cross than that of the Nun entrance.

The chief difficulty in navigating Akassa creek arises from its being so narrow (especially about midway between the rivers) and from the sharp bends in it.†

Tides.—It is high water, full and change, in the entrance to Brass river at 4 h. 30 m.; springs rise 6 feet, neaps 5 feet.

At half ebb, in the month of October 1873, the tidal stream in the entrance was observed to run at the rate of 5½ knots an hour.

St. Nicholas river is little known, and seldom visited; it is situated 9 miles east of Brass river, and separated from it by a slightly elevated wooded land, the coast line of which curves boldly seawards. The eastern bank of St. Nicholas river is terminated by a large rounded point; the western bank is higher, and slopes towards the sea. The two entrance points are very distinct, with the mouth of the river open and bearing N.N.W., but the entrance appears when seen from the offing as if closed by distant wooded land. On the bar there are from 3 to 6 feet at low-water springs, and at 6 miles above the bar St. Nicholas river joins the Brass river.

Santa Barbara river.—The coast eastward of St. Nicholas river is low, covered with mangroves, and fringed by a sandy beach. The entrance of Santa Barbara river lies 10 miles eastward of St. Nicholas river; it opens out on a N.N.E. bearing. Its banks are thickly wooded; the western entrance point is perpendicular, and the eastern point forms a slight slope, having a small part broken into steps.

San Bartholomeo bank.—As far as Santa Barbara river a vessel approaching from the westward may run without fear, at a distance of 3 miles from the coast, in a depth of 4 and 5 fathoms; but at that distance from the land abreast of the river San Bartholomeo, is situated the outer edge of a shoal bank, on which a vessel is likely to be carried rapidly by the flood tide. It is the more necessary to be on the guard against this bank, as the coast line changes its direction rather more to the southward between Santa Barbara and San Bartholomeo rivers.

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* Lieutenant W. C. Karslake, H.M.S. *Merlin*, 1874.

† Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1876.

San Bartholomeo river.—This stream lies about 7 miles southeastward of the entrance to Santa Barbara river; the western entrance point is low and hardly distinguishable; the eastern point is higher and bluff. The entrance of the river does not open out until it bears North. Within the river the land, when seen from the offing, appears low, wooded, and detached like an island. Shoal ground extends 4 miles south from the entrance, close outside which the depth is 3 and 4 fathoms.

Sombreiro river lies 10 miles eastward of St. Bartholomeo river; it does not open out until it bears west of N.N.E.; on the western entrance point stands a clump of trees which at one time perhaps resembled a hat, from which circumstance possibly the name of the river was derived; the eastern entrance point also terminates in a clump of trees. There is a passage over the bar, available it is said for vessels drawing 12 feet, but rendered dangerous by an extensive shoal off its mouth, on which a heavy sea breaks; this shoal, on the outer part of which there is a depth of 2 fathoms, extends 4½ miles off shore. A heavy surf prevailed on the bar during the period of its survey, which would apparently often prohibit access. Sombreiro river may be easily known by Fouche point, situated 7 miles to the eastward of it, on which are some detached lofty trees.

BONNY AND NEW CALABAR RIVERS.* — Fouche point forms the western limit of a large bay or estuary, into which the New Calabar and the Bonny or Obáne river discharge their waters; its eastern limit is Rough Corner point, bearing E. ¾ S., distant 6 miles from Fouche point.

Breaker island, low and sandy, is situated about midway between these points, and to the southward of it shoals and sandbanks extend 5½ miles, dividing the channels leading to the rivers; from the constant changes in these channels, and the little depth of water in them, a pilot is indispensable.

The western shore of the estuary is comparatively free from off-lying banks, but to the eastward of Rough Corner point an extensive flat, known, as Portuguese bank, extends 4¼ miles from the shore.

Sand island.—On the north-western part of Portuguese bank, and S.W. by S. distant 1¾ miles from Rough Corner point, is situated a low narrow island about three-quarters of a mile long, which is nearly covered at high water; the bank, both to the northward and southward of Sand island, breaks at low water, and its western edge is marked by a black buoy in 9 feet.

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* *See* Admiralty plan:—Bonny and New Calabar rivers, No. 622; scale, $m = 1 \cdot 0$ inches.

Outer Baleur bank, divided from Portuguese bank by a narrow channel known as Portuguese channel, has near its western edge a shoal spot of 6 feet water, from which Rough Corner point bears N.N.E. ¼ E., distant 6¼ miles; the whole bank breaks at half ebb, and in rough weather at all times of tide.

Inner Baleur bank, with 7 feet water on it, is divided by a narrow channel from the north extremity of Outer Baleur bank; it breaks at half ebb and is marked on its western edge by a black buoy, from which Rough Corner point bears N.E., distant 4¼ miles.

A shoal, with 2¾ fathoms on it, is reported to lie about 4 cables north of the northern edge of Inner Baleur bank, but its existence has not been verified.

Bank.—A bank, with 2¼ fathoms water on it, lies half a mile westward of Outer Baleur bank; its western edge is marked by a red buoy in 3 fathoms, from which Rough Corner point bears N.E., distant 7¼ miles.

A shoal of 2¾ fathoms lies 4 cables west of the western edge of this bank; the channel between has 3¼ fathoms in it, and is that generally used when entering Bonny river.

Rough Corner point appears as a bluff when bearing from N.N.W. to N.N.E.

Ju-ju point is situated north-east of Rough Corner point, distant nearly a mile. From Ju-ju point the coast trends N.E. for a distance of 3 miles to the factories and mission house of Bonny, a large native town.

Off Bonny town 8 or 10 large hulks are moored, on board of which the palm oil traders reside.

Peter Fortis point, the east extreme of the coast which divides the mouths of New Calabar and Bonny rivers, is situated N.E. ½ N. from Rough Corner point, distant 4¾ miles; on the extremity of this point are four round trees, resembling haystacks when seen from a distance.

The bottom off Peter Fortis point is covered with long weeds, which are liable to choke the valves of a steam vessel if the point is rounded too closely.*

Pilots.—The duty of piloting is performed generally by the masters of merchant vessels engaged in the palm-oil trade, who are far better acquainted with the navigation, and more trustworthy than the native pilots. These latter are stationed on Ju-ju point, and if it can be heard, the usual signal with a gun will be attended to; or a boat may be sent up the river for one of the masters of the merchant vessels generally lying there.

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* Lieutenant O. Churchill, H.M.S. *Ariel*, 1876.

Outer anchorage.—At no season of the year should a vessel anchor off the entrance of Bonny river in a less depth than 7 fathoms, and Fouche point should be brought to bear North or N. ½ W.; not less than 50 fathoms of cable should be veered.

To enter Bonny river.—Having arrived off the black Fairway buoy (from which Fouche point bears N. ½ E., distant 8 miles), with the red buoy west of Outer Baleur bank in line with Rough Corner point, bearing N.E. ¼ E., and Peter Fortis point well open west of it, steer in for Rough Corner point, passing westward of the red buoy; from this the black buoy off the north-western extreme of Inner Baleur bank, and Rough Corner point will be nearly in line; continue on the same course, passing westward of the black buoy, and of the 2¾-fathom shoal that lies 6 cables north-east of it. After passing the 2¾-fathom shoal steer N.E. ½ N. for Peter Fortis point, keeping it well open west of Rough Corner point, pass about 3 cables from Rough Corner point, keeping about the same distance off the eastern shore up to the shipping, when there is anchorage in 10 fathoms, mud, near the mail hulk.

The least water found will be a depth of 3 fathoms at low water, which is crossed when west of the red buoy.

CAUTION.—Mariners are warned that no reliance can be placed on the buoys at the entrance of the Bonny and New Calabar rivers, as they are frequently either out of position or washed away, but should the buoys be gone, Rough Corner point bearing N.E. ¼ E. with Peter Fortis point kept well open west of it, will lead over the bar in the deepest water; or should Rough Corner point be obscured, a vessel must be guided by the western breakers which are always apparent, and should be kept at a distance of about half a mile. Steam vessels drawing 18 feet should wait for 2 hours' flood to cross the bar, those of 12 feet draught and less can enter at any time of tide*

King Amachree's town is situated 15 miles above the hulks moored off Bonny town; there is deep water in the channel between, which lies eastward of an island seen on leaving Bonny town.†

Leaving Bonny river.—Vessels leaving this river may cross the bar in 15 feet at low water by using old Man-of-War channel, which lies eastward of Baleur banks; they should drop down with the tide and anchor southward of the black nun buoy moored off Rough Corner spit, until the next high water, when they may steer out S. ¼ E., taking care to keep the buoy bearing N. ¼ W.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1878.

† Lieutenant H. W. Hill, H.M.S. *Pioneer*, 1878.

Tides.—It is high water, full and change, at Bonny town at 4 h. 50 m.; springs rise 6 feet, neaps 5 feet; the ebb stream sets over Baleur bank, the flood stream sometimes sets over the western shoals, but if the outside current is setting strongly to the eastward, the flood stream will be but little felt.

To enter New Calabar river.—A conspicuous bluff west of Peter Fortis point, just open east of the bush on the east extreme of Breaker island, bearing N.E. by E., until New Calabar river opens east of Fouche point bearing N. by W. ¾ W., carries 10 feet at low water over the bar of that river. This channel breaks right across in the wet season.

From the chequered buoy of the Inner Baleur bank, a N.W. course for Fouche point, avoiding the actual breakers, will lead through a 2-fathom channel into New Calabar river; this channel forms the best means of communication between that river and the Bonny, but it requires buoying, A pilot can generally be obtained at Bonny river, to take vessels drawing less than 12 feet round Breaker island into New Calabar river.

In December 1872, H.M.S. *Pioneer* ascended above the hulks (moored on the west side of New Calabar river 6 miles north of Fouche point) to New Calabar town, a distance of 17 miles, and by keeping within a quarter of a mile of the western shore, a regular depth of from 4 to 6 fathoms was found.

The river above New Calabar town is apparently much obstructed by shoals.

Coast.—From Bonny river to the eastward, a low wooded coast continues; it is swampy, and covered with mangroves, palms, oaks, and such trees as grow in brackish water. Fertile land, more elevated above the sea, lies several miles inland.

When running along the coast between Bonny and Opobo rivers, vessels should keep outside the depth of 8 fathoms.

Antonio river.—Eastward of Rough Corner point, distant 15 miles, is situated Antonio river, or by corruption the Andoney. H.M.S. *Barracouta* anchored off this river in March 1826, the entrance, which is between bluff points and is well defined, bearing N. by E., distant 2½ miles. The mouth is obstrtucted by sand-banks, which permit a passage for boats only. The *Barracouta's* pinnace crossed the bar.

Opobo river,* lying 17 miles E. by S. ½ S. of Antonio river, is not conspicuous when seen from the offing, but a house on Sandy point and the galvanised iron roof of the hulk ashore on that point are visible in clear weather for a distance of 6 or 7 miles.†

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* *See* Admiralty plan:—Opobo river, No. 628; scale, $m = 1{\cdot}3$ inches.

† Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1876.

On the west entrance point of Opobo river is situated a conical beacon, from which the coast trends in a direct line N.E. by N. ½ N. for a distance of 2 miles to Sandy point, on which are several factories. The east entrance point bears E. by N. ½ N. from West point beacon distant 1¼ miles, and the eastern shore of the river trends N.N.E. from it for 1¾ miles, at which distance there are several factories. Several hulks are moored in the river off Sandy point.

Bar.—From both entrance points of Opobo river shoals extend a considerable distance to the southward, the East spit is the shoalest, being almost dry at low water, and having on it at a distance of 3 miles S.S.W. from East point a shoal head of 10 feet, known as Gierkes daughter.

The outer edge of East spit is about half a mile south-west of this shoal, and between it and Western breakers is situated the bar, which is reported to break during the rainy season, and is said to shift its position.

Buoy.—A red beacon buoy is moored on the bar in 2¼ fathoms, at 1$\frac{9}{10}$ miles S. ¼ W. from West point beacon, it is visible from a long distance seaward.

Directions.—Bring the red buoy to bear N.N.E. and steer for it on that bearing, passing close east of it; then steer N. ¼ E. for the beacon on West point, and when clear of the spit extending from East point proceed up the river in mid-channel. Should the fairway buoy be gone, steer in with Sandy point bearing N. by E. ½ E., which will lead across the bar from the offing. H.M.S. *Contest*, in 1876, crossed the bar with a pilot, finding not less than 12 feet at low water springs, and deep water inside.

When requiring a pilot the fore top-gallant sail should be loosed as a signal.*

Vessels drawing less than 10 feet water can enter Opobo river at any time of tide, those of heavier draught must wait until half flood; vessels of 16 feet draught have entered at high water.

Sailing vessels drawing more than 12 feet should not attempt to work out of the river.

Caution.—Great care should be taken at all times when standing in for Antonio and Opobo rivers, as shoal ground extends several miles off shore between them, and the flood tide often draws a vessel in at the rate of 2 miles an hour; all danger may, however, be avoided by paying attention to the lead, and not shoaling the water under 7 fathoms.

Tides.—It is high water, full and change, in Opobo river at about 4 h. 40 m.; springs rise 6 feet, neaps 4½ feet. The tidal stream sets fairly into the channel over the bar.

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* Navigating sub-lieutenant A. S. Mills, H.M.S. *Contest*, 1876.

Quaebo river,[*] the mouth of which is situated 19 miles eastward of Opobo river, is entered between a bluff point on the west, and a low point which bears E.N.E. from it distant 5 cables.

From both these entrance points shoals extend about a mile to the southward, between which there is a channel with a depth of 6 feet in it at low water.

The best channel across this bar is found by steering for the bluff point when bearing N.W. by N.

When across the bar the depth increases to 2 fathoms, which is maintained up to the anchorage off the factory, situated 3½ miles within the entrance.

An umbrella-shaped tree is situated on the shore about half a mile west of the west entrance point, and at 3 miles west of it there is a group of three trees.

From Quaebo river the coast, retaining the same general features, trends E. by S. for about 21 miles to Old Calabar river.

OLD CALABAR RIVER.[†]—The entrance to this river (known as the Kalaba and Oiône by the natives), lies between Tom Shot point on the west, and Backasey head on the east, the latter bearing S.E. distant 11 miles from the former.

A considerable trade in palm oil is carried on in this river, the principal trading post being at Duke town, situated on the eastern side 25 miles within the entrance, and off which large vessels frequently lie for many months.

Tom Shot point, the west entrance point, is long, low, and sandy, being covered with bushes. Northward of this point the coast recedes and forms a bight, the northern point of which is slightly elevated and covered with trees ; this part of the coast is fronted by an extensive shoal bank of black sand and mud known as Parrot spit, which nearly dries at low water.

Parrot island, covered with high mangrove trees, is situated on the west side of the channel about 12 miles north of Tom Shot point; it is of a round form and about 1½ miles in diameter.

Tobacco head, on which are some large trees making like a bluff headland, in shape similar to a boat's rudder, is situated 3¾ miles north of Parrot island.

Alligator island, on which are some remarkable round trees, covers at high water ; it is situated on the west side of the channel 5 miles north of Parrot island ; between these islands an extensive bank known as James flats extends from the western shore; when south-east of Parrot island care must be taken not to mistake this island for Tobacco head.

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[*] *See* Admiralty plan :—Quaebo river, No. 628 ; scale, $m=0{\cdot}9$ inches.

[†] *See* Admiralty plan :—Old Calabar river, No. 149 ; scale, $m=0{\cdot}5$ inches.

Duke town, on the eastern side of the river 5 miles north-east of Alligator island, is situated between two high hills.

The eastern side of Old Calabar river is intersected by numerous creeks and small rivers, fronted by mud flats which nearly dry at low water.

Seven-fathom point, on the eastern side of the river opposite Alligator island, may be recognised from its being covered with high straight mangrove trees.

James island, separated from the main by a deep creek, forms the eastern side of the channel opposite James flats; it is situated 1¼ miles north of Parrot island.

Backasey head is the east entrance point, and immediately east of it is situated Backasey gap, which is very conspicuous, and will first attract attention from seaward when making the land to the eastward of the river. The opening is about one third of a mile in width, and is the entrance of a creek which communicates with Backasey river.

Tom Shot breakers, the southern termination of the shoals on the western side of the channel into Old Calabar river, lie S. by W. distant 9½ miles from Tom Shot point; the least water on them is 7 feet, and in fine weather they only break near low water; from their southern extreme Backasey head bears E. ¾ N. distant 10⅓ miles.

A narrow reef of breaking rocks, about 3 miles in length in a N.N.E. and S.S.W. direction, is situated on the western side of the channel, 1¾ miles N. by E. from Tom Shot breakers.

Buoys.—A large black can buoy with staff and ball is moored in 25 feet water on the eastern side of the entrance to the river; from it Backasey gap bears N.N.E. distant 5½ miles.

A black buoy lies in 3¾ fathoms, 1½ miles east of Tom Shot breakers; from the buoy Backasey head bears E. ¾ N., distant 8 miles.

A red buoy lies in 5 fathoms on the western side of the channel, S.E. ½ E. from Tom Shot point, distant 3 miles.

A red buoy lies in 3½ fathoms on the eastern side of the channel; it is situated E. by N. ¾ N. from Tom Shot point, distant 6 miles.

Caution.—The positions of these buoys are not to be depended upon.

Channel. — The fairway channel east of Tom Shot breakers is 3½ miles wide, maintaining that breadth for about 11 miles in a N.N.E. direction, beyond which it is much narrower: north-east of the red buoy off Tom Shot point there is a detached shoal of 15 feet, on the eastern side of the fairway.

Approach from westward. — In approaching Old Calabar river from the westward great care must be taken to avoid Tom Shot breakers and other shoals westward of them. Should a vessel which is not sure of her position find hard bottom, it would be prudent to haul to the S.E. and make the land about Backasey gap, where a bearing of East head, if it can be seen, will assist the vessel in ascertaining her true position ; the weather is generally so hazy that the mountain peaks cannot be seen except after a tornado. On making Backasey gap from the westward, do not bring it to bear east of E.N.E., which will lead south of the shoals before mentioned ; with the gap on that bearing, in a depth of 3½ or 4 fathoms, the vessel will be in the fairway for entering the river. If at this point a tornado should threaten, it is advisable to anchor until it blows over ; on this part of the coast they usually come from the southeastward.

From Bonny river to Old Calabar river.—When well clear of Bonny bar steer E.S.E. for 48 miles, until the trees along the shore have nearly disappeared below the horizon, or until the depth of 15 or 16 fathoms is reached ; then steer E. by S., when the water will gradually shoal from 15 to 12, 10, and 8 fathoms over a mixed bottom of black sand and mud.

As Old Calabar river is approached, the bottom becomes hard and composed of bright sand, until east of Tom Shot breakers, when it will be muddy.

Caution.—Care must be taken not to approach Tom Shot point, or the western shore of the river entrance, nearer than just to sight the trees upon it from a height of 24 or 26 feet above the sea, and should the water shoal to 6½ fathoms on hard ground, stand out until it deepens to 8 fathoms. By no means come into a less depth than 6½ fathoms over any description of bottom whatever, until East head bears N.E. or Backasey gap N.E. ½ E.; the vessel may then stand towards East head into 5 fathoms, muddy bottom, when, if necessary, anchor and send a boat up the river for a pilot.

Attention to the above remarks will take a vessel clear of the breakers at the western side of the approach to Old Calabar river.

From the eastward.—From a position 1½ miles south of the large black can buoy with staff and ball moored in 25 feet, mud, 5½ miles S.S.W. from Backasey gap, a course of N.W. by W. ½ W. for 7 miles will enable a vessel to sight Tom Shot breakers, and be in a position to proceed into the river.

From the black buoy, steam vessels can steer about N. by W. towards the red buoy off Tom Shot point, allowing at least half a point for the set of tide, and hauling to the south-west should the water shoal to less than 17 feet at high water. The mail packets use this route, which carries 2¼ fathoms at low water.

To enter.—Vessels intending to proceed into the river, having made sure of their position off the entrance by bearings, or by sighting Tom Shot breakers, should steer in N. by E. ¾ E., passing one mile eastward of those dangers, and taking care to guard against tidal influences, as the streams have been known to set both north-east and south-west across the breakers, remembering also that, as a rule, should the water shoal with hard bottom, the vessel is too far to the westward ; if with muddy bottom, too far to the eastward.

This course, (N. by E. ¾ E.) will lead close east of the red can buoy off Tom Shot point ; when this buoy bears S.W., a N.E. by N. course may be steered for 4 miles to make a red nun buoy. Passing west of this buoy at a distance of a quarter of a mile, steer N. ½ W. with the entrance of Great Qua river (which may be known by its eastern bank showing as a green point sloping down to the water's edge) kept rather on the starboard bow, allowing half a point leeway for the ebb or flood streams. When Tobacco head is open east of Parrot island, bearing N.N.W., steer for it, which will lead east of Parrot spit, then steer close along the eastern side of Parrot island until Seven-fathom point, on the eastern side of the river, opens west of James island bearing N. ½ W.

In thick weather, when off Parrot spit, should the water shoal with hard or sandy bottom, haul more to the eastward ; if with soft or muddy bottom, more to the westward.

A direct course from Parrot island should be shaped from James island, keeping close to its westward side, after passing which, keep James and Parrot island just touching ; this course will lead east of James flats in 18 feet at low water. Pass close round Seven-fathom point and keep on the eastern side of the river, (to avoid a long shoal on which there is only 3 feet water, lying in mid-channel,) until abreast of Fish town on the western shore, when the river must be crossed to avoid a ledge of hard ground which fronts the eastern shore, and the western side of the channel should be kept near until Townsend flag-staff, south of Duke town, is abeam, when cross again to the anchorage on the eastern side.

Vessels from Seven-fathom point may stand over for Cross river, and, keeping on the western shore, pass westward of the shoal in mid-channel. This channel is generally used by the local pilots.

Where Cross river joins the main stream there is a shoal of mud with 10 or 11 feet on it, extending from the north entrance point, towards which the ebb stream out of Cross river inclines to set a vessel if not under command.

Fresh water.—The water at Duke town is fresh, but not fit for use. There is a small watering-place at Old town.

Tides.—It is high water, full and change, at Duke town at 5 h.; springs rise 6½ feet, neaps 5 feet; the general velocity of the tidal stream is 2½ to 3 knots an hour at half tide.

Creek town.—Old Calabar river is navigable for vessels for a few miles higher up, but they seldom ascend above Duke town, 2 miles north of which, on the same bank, is situated Old town; these towns stand on tolerably high ground. At 2 miles above Old town, a creek on the western side of the river leads to Creek town. At a distance of 20 miles above Duke town the width of the river is only 20 or 30 yards, and the depth about 6 feet.

Cross river.—The main stream of the Old Calabar, which a vessel ascending to Duke town leaves at Seven-fathom point, continues above Tobacco head to the north-west under the name of Cross river. Mr. Beecroft in 1842 ascended this river for a considerable distance.

The lower reach of this river, above its junction with the Old Calabar river at Alligator island, was found to have only a depth of from 1 to 2 fathoms in it at low water (November), the banks being low and level, but in September 1842, by passing into Cross river through the creek situated immediately south of Fish town, a depth of from 4 to 7 fathoms was maintained, and deep water was found nearly as far as Ethiope rapids, a distance of 200 miles from the sea, the river being generally from 200 to 300 yards in breadth.

At Ethiope rapids the progress of the small steam-vessel in which these discoveries were made, was stopped by the rapidity of the downward current, but smooth water was found to extend for some distance above this point.*

Leaving Old Calabar river under sail.—When descending the river from Duke town, the same track should be pursued as that previously described, as nearly as circumstances will permit; if the wind be contrary, which it generally is, the ebb stream is strong enough for backing and filling where the channel is narrow.

Caution.—At the bar the tidal stream does not run more than a mile an hour during the dry season, the flood generally setting towards Tom Shot point, and over the shoals to the westward. Particular attention must be paid to the tidal stream when beating out with the ebb, or at any time with light winds.

Backasey gap to Rio del Rey.—After clearing Old Calabar river and having passed Backasey gap, an E.S.E. course for 10 miles along the southern edge of the bank extending 7 or 8 miles south-west of the peninsula of Backasey, brings a vessel to the western entrance of an extensive, open, shallow bay 13 miles wide, into which several small streams fall, the western and largest of which, known as Rio del Rey, is 4½ miles wide at the entrance, but rapidly decreases into a narrow channel. The coast of the bay on the eastern side slopes from the lofty Cameroon mountains, and on the western side it is formed by the south-east extreme of Backasey peninsula. The shores are thickly peopled, the inhabitants appearing to be principally employed in fishing.

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* Journal of Royal Geographical Society, 1844.

Villages.—The native villages are large, and, unlike those further south, are built on the shores of the bay, and exposed to view from the water. This feeling of security is produced by vessels having seldom sought slaves in the river; nevertheless these natives are a timid race, and there is great difficulty in holding any intercourse with them.

Coast.—At 9 miles eastward of Rio del Rey, the line of coast, after having continued in nearly an E. by S. ½ S. direction from cape Formoso for 170 miles, turns abruptly to the southward along the foot of the Cameroon mountains. It is principally formed by low cliffs, hollowed in many places so as to form caverns, and at one part there are two rocky cliffs at some distance apart, connected by a gallery, perforated at equal distances by a line of apertures, resembling the work of an engineer in the excavation of a fort.

Cameroon mountain.—The base of this mountain occupies a space of nearly 20 miles in diameter, the highest peak, named Mongo-ma-Lobah, being 13,760 feet above the level of the sea; it is covered with trees of luxuriant growth nearly to the summit, but one bare brown ridge, extending from the eastern side towards the sea, when seen from a short distance appears to be composed of lava. The peak of Cameroon stands so boldly above the surrounding pinnacles, that the descent seems unbroken, giving to the whole the appearance of one vast mountain rising from a single base, although a peak, about 2 miles inland, and 7 miles north-west of Ambas bay, named Mongo-ma-Etindeh, or Little Cameroon, rises to a height of 5,820 feet

Rumby mountains, lying 30 miles north of Cameroon peak, are seen towering in rude and rugged masses, affording a contrast to the apparent regularity of Cameroon mountains; their height must be considerable, as they are perceived when more than 60 miles distant.

Qua mountain.—This mountain, situated 65 miles North of Cameroon peak, is also of great elevation, and can be discerned from a distance of nearly 80 miles. Most of the above mountains are extinct volcanoes, as well as the island of Fernando Po.

Ambas or Amboise bay.*—On the southern side of mount Cameroon, at the base of the peak of Mongo-ma-Etindeh, is situated Ambas bay and islands.

The northern coast of Ambas bay is formed by several bights, the dividing points between which are fringed by off-lying rocks ; the eastern coast is formed by a peninsula 2½ miles long, on which there are four hills.

Morton bay, in the north-east corner of Ambas bay, is accessible only to boats, being fronted by rocks, under shelter of which it has been proposed to build a pier.

On the northern side of Morton bay is situated the missionary settlement of Victoria, at which small supplies can be procured.

Mondoleh island.—In the bay of Ambas are three small islands ; the largest, Mondoleh, at the south-east part of the bay, is only half a mile long, about 200 feet high and rocky, but with a level surface of rich soil, composed of decomposed basalt ; the steep sides of the island are clothed with wood. There are three or four springs of water half-way up the side of the island, which, though scanty, are said to flow always. The landing is bad, but capable of improvement.

Ambas island.—The outer or western island, Domeh or Ambas, is smaller than Mondoleh island and nearly barren ; the rocky slopes and summit are only clothed with a little brushwood and grass. It is in fact a narrow ridge of rock, elevated at the southern extremity, but although nature has here provided no means of subsistence, many natives have made it their home. They exchange fish with the natives of the mainland for plantains and yams, and have also many goats and pigs, which feed on the precipitous sides of the island.

Landing-place.—The only landing-place at Ambas island is difficult of access, on account of the rugged rocks and incessant swell, it lies near the north extreme of the island ; a good pier, however, might be made with very little trouble. There is only one scanty spring of fresh water, which is occasionally dry ; the inhabitants must therefore catch rain-water, and during the dry season obtain supplies from the mainland.

Bobya island.—This island, known also as Pirate island, from the supposed disposition of its natives, lies 1¾ miles N.E. ½ N. of Ambas island ; it is even more barren than the other islands in this bay, and probably formerly joined the adjacent perpendicular cliff on the mainland, as the geological structure is similar, and between them there is but a narrow channel. The process of destruction of this cliff is still going on, as enormous fragments of recently fallen rocks are lying at the north extreme of the island. Although Bobya is much smaller than the other two islands in Ambas bay, it is densely peopled, almost every available spot on its rugged surface being occupied by a hut. It is perpendicular on all sides, and the only access to the summit is by clambering up what appears to be the projection of a basaltic dike—a path, available only for one at a time. The inhabitants, probably, owe to their impregnable position the bad character they have among their neighbours.

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* *See* plan :—Ambas and Nicoll islands, on Admiralty chart, No. 1,456 ; scale, *m* = 2 inches.

These islanders are the principal fishermen of the bay, which in fine weather they cover with their light canoes. This enables them to obtain by barter from the mainland, with which they are in constant communication, the scanty clothing they require, and supplies of yams, plantains, &c.

Pirate rocks, some of which are above water, extend 5 cables south-west from Bobya island, with 7 fathoms close to their southern edge.

Anchorage.—The anchorage is excellent in all parts of Ambas bay, with good holding ground and a depth of 6 to 7 fathoms ; although it forms a lee shore, and there is an incessant swell, the wind is said to seldom blow home so as to endanger vessels. The prevalent wind is from S.W., to which the bay is quite open, and the most stormy months are considered to be July and August ; shelter, however, can be found under Mondoleh island.

Excellent water can also be procured near Kieh, $1\frac{1}{10}$ miles west of Victoria, but only at low tide, as the water gushes out at the foot of a rock. By excavating, however, above high-water mark, a convenient watering place might be made.

The adjacent mainland is nearly devoid of mangrove and swamp ; and as the land wind passes over the lofty Cameroon mountain, it is rendered cool and refreshing. Indeed, from the peculiarity of its situation, and from local circumstances, Ambas bay will probably be found one of the most healthy positions on the west coast of Africa.

H.M.S. *Swallow* in 1877 anchored in Ambas bay, under the lee of Mondoleh island : yams were plentiful and good, but beef and vegetables scarce.

Supplies.—Wood, and generally live stock, may be obtained in abundance, the latter being much cheaper than at Fernando Po.

Tornadoes.—These ordinarily occur about once in twenty-four hours during the rainy season, the rest of the day the weather being generally fine ; occasionally there are days without rain at this season.

Tides.—It is high water, full and change, in Ambas bay at about 5 h. 15 m. ; springs rise 7 feet, neaps 5 feet.

Coast.—Eastward of Ambas bay the coast recedes and forms a bight about a mile deep, at the western part of which there is a long inlet.

Cape Bimbia forms the southern extremity of the base of Cameroon mountains, the land above it rising gradually and regularly from the sea.

Nicoll island, situated 1½ miles eastward of cape Bimbia, lies half a mile from the shore, on the western side of the mouth of Bimbia river. Between it and the mainland on its western side is situated a sheltered anchorage off King William town, but which has only a depth of 2¼ and 2¾ fathoms; there is a watering place about three-quarters of a mile to the northward of the town.

Nicoll island is thickly wooded, and has a shoal bank extending from its western side; the north and south extremities of the island are moderately high, with a low plain between them.

Bimbia river.—This river, the entrance to which lies about 1½ miles north-east of Nicoll island, is about three-quarters of a mile wide at its mouth; the channel is obstructed by a bar, on which there is only a depth of 13 feet, but within there are 4¼ to 6½ fathoms. The anchorage is said to be perfectly safe, but the radiation from Cameroon mountain causes the heat to be very oppressive. The magnificent amphitheatre which forms the eastern side of mount Cameroon is crowned with numerous villages, the inhabitants of which mostly pursue the palm oil trade.

Bimbia river winds round the foot of Cameroon mountain, and then pursues a northerly course; it is connected with the river Cameroon by Matumal and Mordecai creeks.

Cape Cameroon.*—From Bimbia river to cape Cameroon the distance is 14 miles in a south-easterly direction; the shore is convex towards the sea, low, and covered with mangroves, being visible in clear weather from a distance of about 12 miles.

RIVER CAMEROON.*—The entrance to this river is an estuary into which several streams discharge their waters. That branch which comes from E.N.E. appears to be the most considerable, and has been named by the Portuguese the river Cameroon, from the abundance of shrimps found in it. Two other rivers, Donga creek and the Quaqua, enter the estuary from the eastward, and Malimba creek joins it immediately north of Suellaba point, the eastern entrance point.

The river Cameroon has been explored for a distance of 40 miles from the sea; at 12 miles above King Bell's town and about 27 miles from the sea, the river divides into several branches; at 90 miles from the sea further navigation is said to be obstructed by rocks. The river Quaqua has not been explored but is described as being of less magnitude than the Wuri or Dualla (the native name of the river Cameroon above King Bell's town), and obstructed by rocks at about the same distance from the sea. The king of the Quaqua country is said to reside 80 miles up the river, at a place named Longassi.

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* *See* **Admiralty chart:—River Cameroon, No. 1,456.**

Matumal creek.—Immediately north of cape Cameroon the coast recedes and forms a deep bight 4 miles across at its entrance. At the head of this bight is situated the entrance to Matumal creek, which communicates with Bimbia river.

Green patch point, lying N.E. by E., from cape Cameroon, distant 4½ miles, is a round point on the west side of the river covered with green bushes and sloping gently to the sea.

Mordecai creek.—Eastward of Green patch point is the entrance to Mordecai creek, which communicates with Bimbia river.

Rugged point, on which are some trees having a very irregular outline, is the eastern point of entrance to Mordecai creek; from it the coast, without any extensive indentations, trends in a north-easterly direction for 6 miles to Hickory point.

Suellaba point, the south entrance point of the river Cameroon bears S.S.E. from cape Cameroon, distant 5 miles; it is a singularly long, low, narrow point, prolonged at its northern extremity by a sand bank.

Malimba point bears N.E. by E. ½ E. from Suellaba point, distant 8 miles; between these points the coast forms an extensive shoal bay which receives the waters of Quaqua river and Malimba and Donga creeks. At the mouth of Malimba creek, immediately east of Suellaba point, are situated two small wooded islets.

From Malimba point the coast trends N.E. by E., for 6½ miles to King Bell's town, the most extensive opening between them being known as Doctor creek, situated 4½ miles north-east of Malimba point.

Channel.—The navigable entrance to the Cameroon river, between cape Cameroon and Suellaba point, is narrowed to a width of about 1½ miles by extensive shoals, which extend from the shore on either side. Off cape Cameroon a depth of about 3 fathoms is found at a distance of 1½ miles from shore, the depth then suddenly increasing to 8 and 10 fathoms; great caution is therefore requisite on approaching this side of the channel, as the lead gives no warning.

The eastern side of the channel is deeper than the western, a depth of 10 to 12 fathoms being found at 2¼ miles north-west of Suellaba point.

Dogshead shoals.—The banks on the southern side of the entrance extend W.N.W. from Suellaba point for a distance of 2 miles, and are named the Dogsheads; they almost always break heavily, and can be seen from a long distance.

These banks are very dangerous to vessels caught in the entrance by the ebb tide, which rushes with great velocity over them, especially at spring tides.

Dogshead banks are steep-to; on their north-west side, at half a mile from them, will be found a depth of from 10 to 12 fathoms; care should therefore be taken not to approach them too closely, on account of the sudden decrease in the soundings.

Outer anchorage.—Should a vessel be obliged to anchor outside Cameroon river, she may ride easily in 6½ fathoms, with cape Cameroon bearing N.E. ½ E. out of the strength of the tide.

Directions.—When entering the river Cameroon do not shoal the water to less than 6 fathoms, until cape Cameroon bears N.E. ½ E., when Green patch point will be just open east of it. Keeping this bearing on, approach the cape to a distance of about 3 miles in 8 or 9 fathoms water, then steer for Malimba point on an E. ¾ N. bearing, taking care, if the soundings decrease to less than 4½ fathoms, and not a muddy bottom, to keep more to the southward. As soon as the islands at the mouth of Malimba creek open, bearing South, with Green patch point bearing N. ¼ E., steer N.E. by N., for the Rugged trees (a difficult mark for a stranger to distinguish) until Old hole point, the next point east of the rugged trees, appears in line with Hickory point bearing E. by N. ½ N.; run with this latter mark on until within half a mile of Rugged point, or until Doctor point bears E. ¼ S., then steer for Doctor point until Hole point creek opens, when a N.E. by E. ¼ E. course may be steered for Hickory point, until Rugged point is nearly in line with Old hole point; this mark will lead north of the bank lying north-east of Doctor creek and to the anchorage off King Bell's town, where the vessel may come to in 5 fathoms, mud. The channel off King Bell's town is about 350 feet across.*

These channels should be buoyed for vessels drawing over 12 feet; the bottom, however, is very soft and would not damage a vessel on grounding. Mail steam packets drawing 18 feet proceed as far as King Bell's town.

Tides.—It is high water, full and change, in the river Cameroon at about 5 h. 15 m.; springs rise 7 feet, neaps 5 feet. The strength of the tidal stream at half tide is from 2 to 3 knots an hour, and must be allowed for in the navigation of the river.

Pilots.—In the event of a boat being sent up the river for a pilot, from the anchorage south of Green patch point, directions should be given to keep along the northern shore for 6 or 7 miles, until east of the mouth of Mordecai creek, when, if there are any vessels lying off King Bell's town, their masts will be seen.

King Bell's town.—The towns of King Bell and King Aqua, separated only by a little brook, are apparently of great extent and considerable population. The houses are neatly built of bamboo, in wide and regular streets, with numerous plantain and cocoa-nut trees, and even large fields of maize.

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* Navigating sub-lieutenant J. R. Hayden, H.M.S. *Merlin*, 1874.

The settlements are situated on a plain, which, being elevated about 50 feet above the river, and being of a sandy nature, may be considered as comparatively healthy, an inference corroborated by the appearance of the natives, and the accounts of trade agents long resident in the country. A considerable trade has been carried on for many years with the natives, who from their activity in collecting palm oil, and their intercourse with Europeans, have become a large and important community, possessing a high degree of civilization.

Rainy season.—The rains generally commence at the mouths of the Palm Oil rivers in the latter end of May or beginning of June, and gradually increase with strong S.S.W. and S.W. breezes during July and August; towards the end of September they gradually assuage. In July and August heavy squalls frequently prevail, and in these months the wind rarely shifts from S.W. more than a point or two to the southward; the rain is incessant, except for an hour or two about noon.

In October the weather becomes more settled, with light land winds, and occasional showers of rain with moderate sea breezes in the daytime.

Tornadoes.—In October the tornadoes commence, being violent at first; they continue, when the harmattan is not blowing, until the month of May, occurring most frequently and being most violent between the middle of April and the middle of May; they come from N.E. and east, and off the Old Calabar river occasionally blow directly on shore from S.E.

Dry season.—In December, January, and February is the fine season; sea and land breezes blow, and much calm and hot sultry weather is experienced, which is considered very unhealthy at Old Calabar river.

Harmattan.—During the season when this dry easterly wind may be expected (December to February) dense mists locally known as smokes prevail, which are so dense that nothing can be seen at more than a cable from the vessel, and mariners approaching the coast have no resource but to anchor. In March, April, and May the weather is clearer, and occasionally, especially after a tornado, very clear, when the high land of Fernando Po and Cameroon mountain may be seen from a distance of 100 miles; but even during these months a vessel may frequently approach within 7 or 8 miles of the land without seeing it. The nights at this season are very fine.

Occasionally the Harmattan blows continuously for days together.

Temperature.—The average temperature during the year at Old Calabar river is 80° to 90° F., the maximum being 90° F. and the minimum 72° F.; these extremes seldom occur.

Anchorage.—A vessel may anchor off this coast at all seasons of the year, but never in less than 7 fathoms except in case of necessity, because when in less than that depth the swell begins to assume the character of rollers and causes the vessel to ride very uneasily; indeed 10 fathoms is a better depth in which to come to, so that the anchor may be weighed and stowed before making sail.

Commerce.—The natives on the banks of these rivers are exclusively devoted to the palm-oil trade. To seek for that article they ascend the numerous creeks of the delta of the Niger for 40 or 50 miles in their large canoes. Provisions, poultry, meat, and food are scarce, but the rivers abound in fish. Yams, kids, and dry fish constitute the food of the population, who, finding the trade in palm oil more lucrative than that in provisions, sell but little of the latter and at high prices.

Palm-oil season.—The palm-oil season lasts from March to September, when it becomes scarcer, and is out of season, but in fact it may be and is obtained all the year round.

Vessels lie in the rivers at all seasons; they should be housed over with palm thatch, and have their holds thoroughly cleaned, particularly about the bilges and well, and if possible there should be ventilation along the bottom under the cargo; stoves should occasionally be lighted, and the whole vessel kept as dry as possible.

The water in the rivers is very bad, and stock is scarce and dear; vessels should therefore be provided with both.

A trading vessel frequently takes three or four months to complete a cargo of palm oil. A quantity of salt should be procured at cape Verde islands on the passage from England; Kroomen obtained on the Krou coast, and water and provisions purchased at Fernando Po.

During the rainy season the bars of some of the palm oil rivers are occasionally impassable, also at full and change of moon the crossing is worse than at other times.

The best time to enter is, as a rule, at half flood.*

Current.—The general direction and strength of the current is easterly, at the rate of about one mile an hour throughout the year, excepting during the harmattan season, when the direction is changed to W.S.W.; a heavy tornado will sometimes change the set of the current for a day or two, or occasionally when strong winds cause the water to accumulate at the head of the bight, the current will set for a few days to the westward; in October, off cape Formoso, the current has been known to set to N.N.W., at the rate of 34 miles per day, for three days after a tornado. Vessels therefore bound to Bonny river, if overtaken by night, should either anchor or work to windward until the morning ; for if once to leeward, especially during the rains, a dull sailing vessel will have great difficulty in getting again to windward.

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* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer* 1876.

Soundings.—A rough general rule for estimating the distance from the coast between cape Formoso and Old Calabar river, is to allow one mile off shore for every fathom of water ; thus when in 10 fathoms a vessel will generally be as many miles from the shore. It is almost unnecessary to add, that the lead should be constantly used when in the vicinity of the shore.

TIDE TABLE.

Place.	High Water, Full and Change.	Rise.	
		Springs.	Neaps.
	h. m.	Feet.	Feet.
AZORES.			
Flores island - - - -	0 20	3½	
Fayal „ (Horta bay) - -	11 45	4	
St. Michael island (Ponta Delgada) -	0 30	6	
MADEIRA.			
Funchal bay - - - -	0 48	7	
CANARY ISLANDS.			
Tenerife (Santa Cruz bay) - -	1 30	8	6
CAPE VERDE ISLANDS.			
St. Vincent island (Porto Grande) -	6 0	3¼	
St. Jago (Porto Praya) - -	6 0	5	
WEST COAST OF AFRICA.			
Tangier bay - - - -	1 42	8¼	5
Mogador harbour - - -	1 18	10 to 12	
Cape Bojador- - - -	Noon	8	
Senegal river (bar) - - -	8 42	6½	
Gorée island - - - -	8 8	5	
Gambia river (Bathurst) - -	8 10	6 to 9	
Bijouga islands (Orango channel) -	10 0	11	
Isles do Los - - - -	6 35	13	
Sierra Leone - - - -	7 50	12½	
Sherbro river (W. entrance) - -	6 00	11	
Monrovia bay (cape Mesurado) -	6 0	6	
Cape Palmas - - - -	4 30	4	
Cape Three Points - - -	4 0	4	
Cape Coast castle - - -	4 30	6	
Accra - - - - -	4 46	6	
Lagos river (bar) - - -	6 0	3	
Niger river (Nun entrance) - -	4 8	6	
Old Calabar river - -	5 0	6½	5
Cameroon river - - -	5 15	7	5

TABLE OF POSITIONS.

Place.	Particular spot.	Latitude, North.	Longitude, West.	Authorities.
	AZORES OR WESTERN ISLANDS.			
		° ′ ″	° ″	
Flores island	Santa Cruz fort	39 27 00	31 08 20	Vidal.
Fayal „	Castello de Santa Cruz	38 31 45	28 38 25	„
St. Michael	Ponta Delgada, Custom house	37 44 15	25 40 40	„
	MADEIRA ISLANDS.			
Funchal	British consul's house	32 38 22	16 54 45	Raper's discussions in Naut. Mag. 1839 to 1843.
„	Loo rock lighthouse	32 37 47	16 55 5	
Porto Santo island	Fort at Villa Baleira	33 3 30	16 20 15	Vidal.
	CANARY ISLANDS.			
Tenerife island	Santa Cruz, British consul's house	28 28 12	16 14 40	Raper's discussions
	CAPE VERDE ISLANDS.			
St. Vincent island	Bird island summit	16 54 42	25 1 10	Vidal.
St. Jago „	Quail island coal wharf, Porto Praya.	14 54 0	23 30 40	Raper's discussions.
	WEST COAST OF AFRICA.			
Tangier bay	Casbah tower	35 47 10	5 48 40	Arlett.
Cape Spartel	Lighthouse	35 47 14	5 55 40	„
North Cape Blanco	W. extreme of cape	33 8 0	8 36 20	„
Mogador	British consul's house	31 30 30	9 43 30	„
Cape Juby	W. extreme of cape	27 58 0	12 52 30	„
Cape Bojador	W. extreme of cape	26 7 0	14 29 0	Raper's discussions
South Cape Blanco	Sandy beach east of S. extreme of cape.	20 46 27	17 5 40	Belcher.
Senegal river	St. Louis fort	16 0 48	16 33 40	„
Cape Verde	Lighthouse	14 44 15	17 30 30	Owen and Belcher
Gorée island	Fort on summit	14 39 55	17 24 30	Raper's discussions
Gambia river	Flagstaff, Bathurst	13 28 0	16 35 0	Belcher.
Bijouga islands	South breaker	10 40 0	16 8 30	Owen and Belcher
Isles do Los	Crawford island, sandy beach on north side.	9 27 24	13 48 30	Vidal.
Sierra Leone	Free Town, north battery	8 29 57	13 14 30	Raper's discussions
Shoals of St. Ann	Outer north-west patch	7 57 50	13 34 00	Owen.
Cape Mesurado	Government house	6 19 5	10 48 55	Vidal.
Cape Palmas	Lighthouse	4 22 9	7 44 15	„
Cape Three Points	Boidan rock	4 44 40	2 5 45	„
Cape Coast Castle	N.E. bastion	5 6 5	1 13 40 West	„
Accra	W. bastion, fort James	5 31 48	0 11 30 East	„
Cape St. Paul	Wyee, clump of trees	5 49 56	0 58 30	„
Lagos river	English church	6 28 21	3 25 50	Denham.
Benin river	North entrance point	5 46 1	5 3 5	Vidal.
Niger river	Palm point	4 16 10	6 4 50	Denham.
Old Calabar river	Duke town flagstaff	4 56 24	8 20 45	Vidal.
River Cameroon	Cape Cameroon	3 55 0	9 30 0	„

The longitudes of positions from Tangier bay to Sierra Leone depend upon that of Tangier, which itself depends upon Gibraltar dockyard flagstaff being in 5° 21′ 17″ W.

From Sierra Leone to the southward and eastward, the longitudes depend upon that of Sierra Leone, which is referred to Tenerife and Porto Praya.

The longitudes of all positions among the Azores, Madeira group, Canary islands and Cape Verde islands depend upon that of Funchal (British consul's house), being considered to be in 16° 54′ 45″ W.

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APPENDIX.

The information contained in this Appendix follows the order of the paging of the book; the pages referred to are given in the margin.

INFORMATION RELATING TO CHAPTER I.

THE AZORES.

All Bearings are Magnetic. VARIATION in 1885.
Fayal island - - 25° 30′ W. | San Miguel - - 24° 30′ W.

FAYAL ISLAND.—LIGHT.—The Portuguese Government proposes to construct a lighthouse on the western extremity of Fayal island, abreast of Capellinha rocks. p. 22.

Horta Bay.—**Breakwater.**—The breakwater in course of construction in Horta bay, affords shelter to three or four sailing vessels, if moored.*

Landing.—The landing place in Horta bay, at which it was sometimes impossible to effect a landing on account of the sea, is now much sheltered by the advanced state of the breakwater.

Reported rock.—The French Government has given notice that the commander of the mail steam-vessel *Ville de Bordeaux* reports the existence of a rock, over which there is a depth of 9 feet, situated southward of Garça point (Guia head), the south-east extreme of Guia peninsula, about 120 yards from the land.† p. 23.

SAN MIGUEL.—PONTA DELGADA.—Breakwater.—The breakwater in progress at Ponta Delgada (1882) affords considerable shelter; there is a depth of 23 feet at low water in the harbour.‡ p. 35.

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* *See* Admiralty charts; Azores, or Western islands, No. 1950; Fayal, Pico, &c., No. 1855; and Fayal channel, and Horta and Pim bays, No. 1940.

† Originally published in Notice to Mariners, No. 2 of 1881.

‡ *See* Admiralty chart:—San Miguel island, No. 1854.

Coal.—A considerable quantity of coal is kept in store at Ponta Delgada.

p. 36. **Signals.**—Information has been received from Her Britannic Majesty's Acting Consul at San Miguel (St. Michael), that the following signals for communication between vessels and the shore are in use at Ponta Delgada, San Miguel :—*

From vessels to the shore :

1. Want a pilot—National flag at the fore with pendant under.
2. Am damaged—Pendant at the fore with national flag under.
3. Have no anchors—National flag at the main with pendant under.
4. Am very leaky—Pendant at the main with national flag under.

From the shore to vessels :

5. Look out for a good place to receive a pilot—Red flag with streamer under.
6. Pilot cannot be sent on board—Streamer with red flag under.
7. Put to sea with the least delay—National flag with red flag under.
8. Can come into the harbour—Red flag.
9. General prohibition to enter the artificial harbour—Black ball with red flag under.

NOTE.—The International Code of Signals is used to communicate with vessels ignorant of the port regulations.

INFORMATION RELATING TO CHAPTER II.

VARIATION in 1885, 18° 40′ W.

p. 69. **CAPE JUBY.**—In making cape Juby it may be well to sight the coast 9 or 10 miles distant, and then run along shore till the bush covered knoll is seen ; the cape does not show out well except from the N.E. and S.W. Making the coast a little to the S.W., and standing north would, perhaps, be preferable, especially in the early morning when the sun is low.†

The *Espiegle* anchored in 11 fathoms, bottom dark sand, with cape Juby tuft bearing S. 76° E., the point southward of bay, S. 47° W. ; this position being about 1½ miles from the reef behind which a trading hulk is at present moored.

Between the reef which extends south-westward from the cape and the shore, a shallow basin, barred at the entrance (on the south side), is formed.

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* Originally published in Notice to Mariners, No. 170, of 16th September 1880.

† *See* Admiralty chart :—Santa Cruz to cape Bojador, No. 1,229. From a report made by Captain C. A. Bridge, R.N., H.M.S. *Espiegle*, 1881.

At low water there is only 2 feet on the bar, and with some winds only one foot. The reef dries at low-water. p. 69.

Proceeding in a boat from the ship, with the tuft and the building on the reef in line, depths of 7, 6, 5¾, and 4 fathoms were found. The sea broke heavily on the inner side of the reef and on the mainland; and for about 100 yards between the lines of breakers the sea was very confused. Along the inner side close to the breakers the depths were 11, 8, 10, and 6½ feet about 80 yards to the eastward of the hulk, and beyond that it appeared continuous breakers. On the north side the depths were from 3 to 4 feet; alongside the hulk 8 feet.

It is reported that this small basin is silting up; the bank on south side is growing out, and had approached the hulk 35 feet during an interval of two months. Also that the current frequently runs to the south-west at the rate of 6 knots round cape Juby. During the stay of the *Espiegle* it was running between 2 and 3 knots.

A building has been commenced on the west point of the reef, and during high tides the surf breaks heavily all round it, rendering landing impossible, even during fine weather. And it was stated that this (the day on which the *Espiegle* arrived) was the first day during the previous two months that it had been possible to communicate with the reef, and that a small schooner of 25 tons had not been able to get out of the basin. The hulk was taken in while quite light. She grounds at low water.*

Though it is quite smooth water inside at low tide this reef could not be considered to afford permanent shelter even for small boats, as the sea must be dangerous during a gale at high tide. Before attempting to enter the basin behind the reef, the state of the surf should be carefully noted.

There are no supplies to be obtained here. Water and fresh meat are obtained from Lanzarote.

The dwellers in the immediate neighbourhood are reported to be well disposed; but formidable tribes from a distance occasionally visit Juby on marauding expeditions. Cape Juby is 150 miles from the nearest caravan track.

---

* The hulk is the property of the North-west African Company.

INFORMATION RELATING TO CHAPTER IV.

CANARY ISLANDS.

VARIATION in 1885.

Teneriffe - - 19° 30′ W. | St. Vincent- - 20° 0′ W.

p. 95. **PALMA ISLAND.—Santa Cruz.**—It is intended to prolong the mole a distance of 44 yards, to facilitate the loading of vessels and boats.*

p. 101. **TENERIFFE.—Santa Cruz.†—Buoys.**—Three buoys for the use of vessels getting under way, lie in the roadstead in the following positions; viz., the northern buoy in 19 fathoms, with the lighthouse bearing S.W. by W., distant 4¼ cables; the southern buoy in 24 fathoms, with the lighthouse bearing North, distant 3½ cables; and the inner buoy in 4¼ fathoms, with the lighthouse N. by E. ½ E., distant 2 cables. These buoys are painted red; their present positions are not to be depended on.

Beacon.—The battery of Paso Alto (Fuerte de l'Altura), which formerly served as an anchorage mark in Santa Cruz road, is now in ruins, and scarcely to be distinguished; but it is intended to erect on the site of the battery, a white pyramid, to answer the same purpose.

Fort.—A new fort, named Cindadela, with its walls painted red, is situated northward of fort San Antonio, and about 2 cables south-westward of fort San Miguel; it forms a good land mark.

p. 104. **GRAN CANARIA.—Grando point.—The Shoal,** distant 6½ cables in an E. by N. ½ N. direction from Gando point, is only awash at low water; at other times the sea does not always break on it.‡

As several vessels have been lost on this rock, it is advisable to give it a wide berth.

p. 109. **LANZAROTE.—Port Naos.**—Fort San Josef, a massive circular fort on the mainland opposite the northern end of Cruces island, is a prominent object and useful as a seamark.§

The northern entrance to the port appears to have not less than 18 feet at low water. There is plenty of water in port Naos close in shore by the mainland, after passing the entrance; but the port is so small that not even a gun vessel would have room to swing.

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* *See* Admiralty chart:—Palma, Gomera, and Ferro islands, No. 1,873.

† *See* Admiralty plan of Santa Cruz, No. 1,856; scale $m = 5 \cdot 7$ inches.

‡ *See* Admiralty chart:—Gran Canaria island, No. 1,869.

§ *See* Admiralty chart:—Lanzarote island, No. 1,852, and plan of port Naos, No. 886, cancelling plan on chart No. 1,852. Remarks by Captain C. A. Bridge, H.M.S. *Espiegle*, 1881.

Lights.—The two leading lights are shown on iron poles placed by the side of two white beacon houses, which are also very conspicuous.

Anchorage.—The *Espiegle* anchored half a mile outside the entrance in 16½ fathoms with fort St. Gabriel bearing West, port Naos south-east light N. 63° W., right extreme Cruces island N. 37° W.; the bottom is apparently coral as a lead fouled and was lost. This berth was found convenient for receiving coal in lighters from the coal stores which are situated on the northern end of Cruces island.

Supplies.—Coal.—A French steamship company whose vessels call at Lanzarote have a coal store on Cruces island, containing at the time of the visit of the *Espiegle* about 350 tons. The North-west African company also has a store, in which about 200 tons had recently been deposited.

Supplies are not plentiful at Lanzarote, that of water depends entirely on the rains. In the year 1881 there was a severe and disastrous drought. Some years ago the drought was so bad that 8,000 of the inhabitants left, chiefly for the river Plate.

ERRATUM:—Page 113, line 13, from top, *for* lat. 23° 26′ N., *read* lat. 23° 36′ N. p. 113.

INFORMATION RELATING TO CHAPTER V.

VARIATION in 1885.

River Ouro - 19° 0′ W. | Senegal river - 19° 20′ W.

RIVER OURO.—The general uniformity of the coast makes it exceedingly difficult when approaching the estuary of this river to ascertain the vessel's position by the appearance of the land. The soundings laid down on the Admiralty coast chart, as also the plan of the inlet or estuary inside the bar, are good guides; and there does not appear to be any alteration of importance since the survey of 1820.* p. 113.

Bar.—The estuary of the Ouro is a splendid sheet of tranquil water in the prevailing N.E. wind, and from the bar presents the appearance of a sea with high bluffs on the eastern side, and what seems a low sand island (the peninsula) with occasional bluffs of moderate height on the western. The channel of access to it had (1881) only 12 feet at low water springs; vessels should not attempt to enter without first buoying the channel, as it is impossible to get any leading marks. The water on the western side (that of the peninsula) shoals very gradually, and at many points landing from a boat would be difficult.

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* *See* Admiralty charts:—Cape Bojador to cape Blanco, No. 1,230; river Ouro, No. 605. Remarks by Captain C. A. Bridge, H.M.S. *Espiegle*, 1881.

At the bar the young tide occasionally makes strong eddies. The full influence of the tide is felt as far out as Durnford point; this should be remembered in making for the outer anchorage near that point.

The river at the head of the estuary apparently disappears altogether at certain seasons.

The estuary abounds in fish, which can be easily taken in the seine. Winged and other game are to be seen in large numbers on the peninsula. It need hardly be said that there is no fresh water supply. The country is one almost unbroken series of undulating sands over which a few shrubs are dotted.

The Canary fishermen state that the wandering Moors rarely come to the extremity of the peninsula, but are found near its junction with the mainland. According to some authorities these Moors are of a barbarous disposition; the fishermen, however, describe them as "tame."

Anchorage.—It may be well for a vessel proceeding to the Ouro to keep on the line of soundings marked on the chart. Deception cliff is a noteworthy object and a good mark for vessels when at no great distance from the land. The estuary of the Ouro can be easily seen over the Peninsula from aloft; at one or two places it can be seen from the deck.

In anchoring near Durnford point it will be advisable not to approach the south-west corner of the peninsula within 6 cables, as a shoal with soundings of 9 to 15 feet extends south-westward of the point. All along the southern end of the peninsula the water is shoal for 3 or 4 cables, the deepening being very gradual. Breakers are visible 2 miles S. by E. of the point.

Good anchoring ground in 6 or 7 fathoms somewhat less than a mile from the extremity of the peninsula, can be reached by coming in on an easterly course which will lead clear of doubtful spots. This anchorage in the prevailing N.E. wind has smooth water, and is frequented by fishing schooners from the Canary islands, which vessels also anchor in soundings out of sight of land south of the Ouro.

p. 119, 120. **LEVRIER BAY.**—The depths in Levrier bay have considerably changed, especially near cape St. Ann. Caution must be used in navigating this bay, and great attention should be paid to the use of the lead.*

p. 125. **SENEGAL RIVER.**†—The ruined tower of N'Diago, formerly affording a conspicuous land-mark at about 8½ miles northward of St.

---

* *See* Admiralty chart:—Levrier bay, No. 1,699.

† *See* Admiralty chart:—Cape Blanco to cape Verde, No. 1,231, and plan of St. Louis or Guet N'Dar and Senegal bar, No. 1,001; scale $m = 0{\cdot}9$ inches.

Louis, no longer exists, but near its former position there is a village easily recognised by two or three large warehouses with red roofs, erected on a small eminence.

Bar.—In November 1881 the bar of Senegal river was reported to have shifted 2 miles to the southward, the entrance to the river being then situated in lat. 15° 51′ N.

In December 1882 the depth on the bar was 9½ feet at spring tides, and a vessel drawing 6 feet, bumped heavily when crossing it.

In 1884, vessels of 8 feet draught crossed the bar.

Outer anchorage.—Good anchorage will be found outside the bar with St. Louis lighthouse bearing N.E. ¼ N.; the pilot's semaphore N.E. by E. ¾ E., and the village of Mouït S.E. by S.

In line 14, for lat. 18° 44′ 30″ N., *read* 14° 44′ 30″ N. p. 128.

INFORMATION RELATING TO CHAPTER VI.

CAPE VERDE ISLANDS.

VARIATION in 1885.

Cape Verde islands - - 20° 0′ W.

ST. ANTONIO ISLAND.—LIGHT.—A harbour light, intended as a guide to the anchorage, is exhibited from punta do Sol, or North point, St. Antonio island. The light, shown from a pillar of masonry, is a fixed *red* light, elevated 23 feet above the sea (18 feet above the ground), and should be visible in clear weather from a distance of about 3 miles.* p. 137.

SAINT VINCENT ISLAND.—Porto Grande.—Telegraph cables.—Two additional telegraph cables have been laid from the northern part of Porto Grande, for communication with Madeira and Pernambuco respectively—and that in consequence, the two buoys previously marking the 1874 cables, have been replaced by others of a larger size, painted red, and surmounted by staff and frame globe; these buoys are placed a little westward of the former positions:—† p. 140.

The northern buoy is moored in 8 fathoms, with punta do Ribeira Julian bearing N. 28° E. distant 5½ cables; and punta do Moro Branco, West.

The southern buoy is moored in 4¾ fathoms, on the line joining the northern buoy and the fort. A smaller buoy, without a globe, lies eastward of the southern buoy, in 3¾ fathoms, indicating the position where the new cables separate.

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* *See* Admiralty plan:—St. Antonio island, No. 367.

† *See* Admiralty plan of Porto Grande, No. 370.

Prohibited anchorage.—Anchorage eastward of these buoys, or in the vicinity of the telegraph cables, is prohibited. Vessels approaching from the northward at night should not anchor, or steer towards the anchorage, until the red light on the Custom house pier (which is obscured by Fort point) is in sight.

Wreck.—The German steam vessel *Denderah* lies sunk in 9 fathoms, near the centre of Porto Grande, with Bird island lighthouse bearing North, and ponta do Moro Branco W.N.W.

The two masts are above water, and two lights placed vertically, are exhibited at night on the foremast.

Bird or Jow island.—LIGHT.—A *fixed* white light has been established on Bird island, visible from the northward between the bearings of S. 32° W. and N. 81° W., and from the southward between N. 75° E. and S. 71° E.; it is elevated 306 feet above high water, and should be visible in clear weather from a distance of about 14 miles. The lighthouse, 40 feet high, is circular in shape and constructed of iron.

A semaphore station, from which messages will be transmitted to an agent of Lloyd's, has been established on Bird island. Passing vessels should communicate by the Commercial Code of Signals.

p. 144. **SAL ISLAND.—Mordeira bay.—Shoal ground** has been found to extend from Turtle point, south side of Mordeira bay. This shoal ground, on which the French frigate *Resolue* touched, is composed of coral, and extends more than one mile in a West direction from Turtle point, with depths of from 3¼ to 5 fathoms. Vessels entering Mordeira bay from the southward should give Turtle point a berth of 2 miles.*

p. 151. **ST. JAGO ISLAND.—Bank.**—A bank of 6 fathoms has been reported to lie between the entrance points of Porto Praya, and nearly south of the town. This may be a part of the 7 fathom shoal, situated about 3 cables E.S.E. of the south point of Quail island, or a continuation of it to the southward. The bearing on the chart, and also in the directions for entering (the centre of the town N. by W.), should be used with caution.†

Coal.—The supply of coal formerly maintained at Porto Praya has been exhausted, and will probably not be replenished.

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* *See* Admiralty charts :—Sal island, No. 379 ; English road and Mordeira bay, No. 381.

† *See* Admiralty plans of St. Jago, and Porto Praya, Nos. 383 and 384.

INFORMATION RELATING TO CHAPTER VII.

VARIATION in 1885.

Gambia river - 19° 30′ W. | Sierra Leone - 19° 50′ W.

p. 157. **GAMBIA RIVER.—Buoys.**—The fairway buoy now lies in 4¾ fathoms, with the following bearings :—

North end of Red cliffs, cape St. Mary, S.S.E. ¾ E. distant 9¼ miles.*

The middle buoy lies with cape St. Mary bearing S. 6° W. distant 4½ miles.

African knoll buoy is now moored near the north-east edge of African Knoll, with cape St. Mary bearing S.W. by W. ½ W. distant 6⅒ miles. The positions or colours of these buoys must not be depended on.

p. 161. **CASAMANZE RIVER.**†—The Great Pass was closed in 1882, but the Pass north of Etoile bank had a depth of 13 feet at high tide.

p. 172. **JEBA RIVER.**‡—**Arcas channel.—Buoys.**—The following buoys have been laid down in Arcas channel—

A buoy painted black and red in horizontal stripes, is moored in 6 fathoms in the fairway of the northern entrance to Arcas channel. From this buoy, St. Martin grove bears North ; Bulama point South, and Arcas island S. 62° E. Vessels should pass northward and eastward of this buoy.

A buoy painted black with the word Arcas in white letters is moored in 6 fathoms off the western extreme of Arcas flat, with St. Martin grove bearing North ; Pedralva rock W. ½ N., and Arcas island N. 61° E.

Vessels should not pass between this buoy and Arcas island.

A red buoy moored in 5 fathoms marks the south-east extreme of the shoals extending from Pedralva rocks, with that rock bearing N. 65° W. ; Bulama point S. 4° E., and Arcas island N. 62° E. Vessels should pass eastward of this buoy.

Pedralva rocks.—These rocks are marked by a wooden mast 36 feet high surmounted by a black ball.

p. 173. **BOLOLA CHANNEL.—Buoys.**—A chequered black and white buoy is moored in 6 fathoms, southward of Areia Branca shoal at the western entrance of Bolola channel, with Benison point bearing N. 17° E. ; Lawrence point East, and Bulama point N. 30° W.

Vessels can pass close southward of this buoy, but not between it and Areia Branca shoal.

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* *See* Admiralty charts :—Cape Verde to cape Roxo, No. 599 ; and Gambia river, No. 608. From Gambia Notice, No. 15, of December 1884.

† *See* Admiralty chart :—Cape Verde to cape Roxo, No. 599.

‡ *See* Admiralty charts :—Cape Roxo to Isles de Los, No. 600 ; Bijouga islands, Nos. 1,724 and 1,727.

A buoy painted black and white in horizontal stripes is moored in 5 fathoms south-eastward of Mao bank, with Hankey point (Bulama island) bearing N. 8° W., and Lawrence point S. 41° W.

A buoy painted black and white in horizontal stripes is moored in 3½ fathoms close southward of the shoal extending from the south extreme of Biafares island, with Lawrence point bearing S. 50° W.; Benison point West, and Hankey point N. 32° W.

p. 174. NOTE.—Vessels entering port Beaver should keep in mid-channel between the two last named buoys.

INFORMATION RELATING TO CHAPTER VIII.

p. 193. **MELLACOREE RIVER.***—A shoal of 15 feet has been found in the South channel to Mellacoree river; it is said to be 3 cables long N.E. and S.W. and one cable wide, with the centre of Matacong island bearing N. 8° E.; Sallahtook point S. 48° E., and the remarkable tree upon Bellansang point S. 82° E.

p. 198. **SIERRA LEONE.—Orontes bank.**†—When approaching Sierra Leone from the southward in June 1881, soundings were obtained by H.M.S. *Orontes* in 11 fathoms W. by S. ¾ S. distant 43 miles from cape Sierra Leone. The soundings then decreased to 9 fathoms and again increased to more than 16 fathoms; the bank apparently extending about 10 miles in a N.N.E. and S.S.W. direction.

This bank was subsequently crossed in the same direction in October 1881 by the steam ship *Benguela*, when Lieutenant A.M. Field, R.N., obtained soundings in 9 fathoms, and verified the position reported by the *Orontes*.

p. 199. **Freetown.**‡—The buoys formerly moored off Freetown have been removed.

p. 203. **SHERBRO RIVER.—Buoys.**—The buoys which formerly marked the several positions of the shoals in Sherbro river have all disappeared (1880). It is the opinion of experienced local pilots that no vessel drawing more than 18 feet water can safely ascend the river.§

p. 214. **WATERHOUSE BAY.—Rock.**—A rock of small extent consisting of several sharp pinnacles, with a least found depth of 2½ fathoms at low water spring tides, lies with the Agent's house, Grand Bassa bearing N. 47° E. distant $1\frac{9}{10}$ miles; and the outermost Dhouat rock S. 32° E. From the temporary character of the buoy marking this danger, dependence should not be placed on its being in position.*

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* *See* Admiralty chart:—Foreecarreah, Mellacoree and Taunah rivers, No. 614.

† *See* Admiralty chart:—Isles do Los to Sherbro island, with plan of I. do Los, No. 601.

‡ *See* Admiralty plan:—Sierra Leone river, No. 616; scale *m* = one inch.

§ *See* Admiralty chart:—Sherbro river, No. 617.

INFORMATION RELATING TO CHAPTER IX.

VARIATION in 1885.

Great Nanna Krou - - 28° 0′ W.

GREAT NANNA KROU.†—**Sunken dangers.**—The position of the reported rock said to lie about $3\frac{1}{4}$ miles S. $\frac{3}{4}$ E. from Neatano point was examined in 1881 by the German vessel of war *Victoria*, but not less than 12 fathoms water were found. p. 222.

Sperling rock.—This dangerous rock which is small, steep-to, and seldom breaks, has over it a depth of 9 feet and lies W. $\frac{1}{2}$ S. about one mile from King William's town, and S.S.E. distant $4\frac{3}{4}$ miles from Neatano point. Depths of 9 to 11 fathoms were found in all directions close to Sperling rock.

From the wreck of the steam ship *Carlos* sunk in 5 fathoms, Neatano point bears N.E. by E. distant three quarters of a mile.

CAPE PALMAS.—**Buoys.**—The spar buoy formerly placed south-west of Outer rock, and the can buoy near Yoruba rock have been removed.‡ p. 231.

INFORMATION RELATING TO CHAPTER X.

VARIATION in 1885.

Axim bay - - - 18° 30′ W.

TAFOU POINT.—The four tall palm trees which formerly served to distinguish Tafou point, entrance to Tabou river, have disappeared.§ p. 234.

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* *See* Admiralty chart:—Cape Mesurado to Baffon bay, with plan of Edina and Grand Bassa, No. 1,364.

† *See* Admiralty chart:—Baffon bay to Grand Bereby, No. 1,365.

‡ *See* Admiralty chart:—Garraway point to Growa point, with plan of cape Palmas, No. 1,697.

§ *See* Admiralty chart:—Baffon bay to Grand Bereby, with plan of Tabou river, No. 1,365.

247. **ANCOBRA RIVER*** flows into the sea 2 miles N.W. of Axim. It is from 80 to 100 yards wide from its mouth to Akanko, and about the month of June, when the river is at its highest, carries $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, but it again becomes low in September. Boats are taken up to Tomento, about 50 miles from the mouth, whence there is communication by land with the Wassau gold mines. At Tomento the river ranges about 25 feet between its high and low state, and tidal influence extends 8 miles up from its mouth.

Bar.—There is a depth of 6 feet upon the bar, with hard bottom, which does not change much, and the rise of the tide is 3 feet.

248. **AXIM BAY.—Hoeven rock.**—During an examination of the shoal ground around Hoeven rock by H.M.S. *Wrangler*, in the year 1883, a rocky head of about 10 yards in extent, with 9 feet least water, was found. It lies with the following bearings and distance:—Acrumassi point, N. 10° E., Fort St. Anthony, Axim, S. 82° E., distant $1\frac{3}{16}$ miles, and Pepré point, S. 44° E.*

Foul ground with depths of 4 to $5\frac{1}{2}$ fathoms was found to extend from the rock, for the distance of half a cable in all directions.

Buoy.—A conical, black and white chequered buoy, with staff and cage has been placed in $6\frac{1}{4}$ fathoms, half a cable S. 60° W. from Hoeven rock.

INFORMATION RELATING TO CHAPTER XI.

VARIATION in 1885.

Cape Three points - 18° 20′ W. | Elmina Bay - - 18° 0′ W.

250. **CAPE THREE POINTS.—Light.**—The light is visible in clear weather from a distance of 13 miles, and may generally be depended on.†

259. **ELMINA BAY.**†—The outer rock on the reef extending eastward from Elmina point uncovers 2 feet at low water, and has a depth of 8 or 9 feet close outside it; this rock lies three quarters of a cable from the extremity of Elmina point.

In fine weather rollers break at a distance of $1\frac{1}{2}$ cables from Elmina point, but in bad weather they extend to a distance of 3 cables from the shore.

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* *See* Admiralty charts:—Grand Bereby to cape Three points, No. 1,362; Africa west coast anchorages, No. 1,713; Grand Bassam to cape Paul, No. 2,772; and Gambia river to cape Lopez, No. 594.

† *See* Admiralty charts:—Grand Bereby to cape Three points, No. 1,362; cape Three points to Barracoe, No. 1,359; and plan of Elmina bay, No. 1,713; scale $m = 4$ inches. From H.M.S. *Briton* and *Mallard*, 1881.

In the vicinity of this reef the bottom is composed of fine black sand. p. 260.

Beyeh river.—The channel leading into this river lies on the northern side of the passage between the stone embankments, and is from 3 to 4 feet deep.

Between Beyeh river entrance and the reef extending from Elmina point, there are depths of from 3 to 8 feet, over fine black sand with rocky patches.

The bridge across the river within the entrance is 6 feet above high water, and is built on two arches, each 20 feet wide; above this bridge for a short distance Beyeh river is about 40 feet wide, with a depth of from 3 to 4 feet in mid-channel on a black sandy bottom.

The deposit from Beyeh river is slight and appears to be carried well to seaward by the ebb stream.

Anchorage.—In Elmina bay there are depths of from 18 to 24 feet until within about 1¼ cables from the beach and the same distance from the reef extending from Elmina point; the bottom is of fine black sand, fair holding ground.

Current.—The current follows the course of the shore round Elmina bay from west to east; there is an indraught to Beyeh river on the flood.

APAM.—Wreck.—An American barque which has been burnt, lies sunk in the anchorage off Apam. The wreck, with about 3 fathoms over the hull, lies in 5½ fathoms water, with Assakri Black rocks bearing N. 17° E.; Mumfort fort point S. 80° W.; and Apam fort N. 51° W.*

PRAMPRAM ROAD.†—A buoy, consisting of three casks lashed in a triangle and supporting a spar with a board upon it, 16 feet high, has been moored in 33 feet water, S.S.E., distant 20 yards from the wreck of the *Sarah E. Kingsbury*, sunk in Prampram roads. p. 270.

The board is painted green, with the word *wreck* upon it in white letters.

From the buoy, the west house on Prampram beach bears North, and the centre of Ponee N. 76° W.

These bearings place the buoy in lat. 5° 41′ 15″ N., long. 0° 8′ E.

VOLTA RIVER.—Beacons.—The beacons which formerly marked the direction of the best water over the bar of the Volta river have been removed.‡ p.272-273.

Caution.—A depth of from 19 to 21 feet was found on the bar at one hour before high water, when examined by H.M.S. *Bullfrog* in 1884.

No vessel should attempt to cross the bar, which is constantly shifting, except in fine weather, and with the assistance of a pilot, as there are now neither buoys nor leading marks.

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* *See* Admiralty chart:—Cape Three points to Barracoe, No. 1,359.

† *See* Admiralty charts:—Gambia river to cape Lopez, No. 594; Barracoe to cape St. Paul, No. 1,360.

‡ *See* Admiralty chart:—Volta river No. 397.

Town.—The principal merchants reside at a town locally known as Riverside, situated on the right bank of the Volta, at 1¾ miles within the western entrance ; the produce brought down the river is landed at Riverside and conveyed across to Beach town, on the sea coast, for shipment.

Foah is situated on the bank of the river close to Riverside, and is marked by a large clump of palm trees.

Riverside, Foah, and Beach town, are collectively known as Adda-Foah.

Tides.—It is high water, full and change, at Riverside, at 4 h. 20 m.; springs rise 4 feet in June. At the mouth of the river (in February) springs rise from 5 to 6 feet, neaps 3 feet.

The range of tide is affected by the state of the river; when at its lowest (about March) the range at springs is sometimes as much as 6 feet, as the river rises the strength of the stream increases, and the tides have not so much effect ; when at its highest (in September and October) the range at Riverside is reduced to one foot or less.

Upper river.—At Medica, 50 miles within the entrance, and where the stream is one-third of a mile wide, the difference of level between the high and low state of the river is about 45 feet; at the entrance, owing to the large expanse over which the waters are spread, the difference is not more than 4 or 5 feet.

A vessel drawing 6 feet water can ascend to Medica from July until November ; during the remainder of the year a vessel of that draught would experience difficulty in proceeding to Duffoa island (40 miles within the entrance), and could not ascend above that point.

INFORMATION RELATING TO CHAPTER XII.

VARIATION in 1885.

River Benin	16° 0′ W.	Niger river	16° 0′ W.

. 276. **CAPE ST. PAUL.—Villages.**—Coasting eastwards from cape St. Paul, after passing Quitta, the second white house seen, will point out the position of Adaffi, situated 14 miles north-eastward of Quitta. The village of Danoe, with a custom house and factory, lies 2 miles eastward of Adaffi, and has a white hut near its eastern extremity. Afloa, at which there are English and German trading stations is 3½ miles eastward of Danoe ; Bey-Beach or Lomeh is 3 miles eastward of Afloa ; and Bagdad or Bagadah nearly 7 miles eastward of Bey-Beach, thence to Porto Seguro the distance is about 7 miles.*

Afloa is probably the Flohow or Porourah described in the pilot.

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* *See* Admiralty chart:—Cape St. Paul to Porto Novo, No. 1,860.

p. 28

RIVER BENIN.*—The entrance to this river is difficult to distinguish from seaward; the northern entrance point (North point), 100 miles south-east from Lagos bar, forms a well-defined elbow, while on the southern side there is only a gentle curve, particularly difficult to recognise when bearing N.E.; from abreast of North point the opposite shores take a parallel direction for 4 miles in about a N.E. ¾ E. direction, and are 1½ miles apart; both sides are flat and swampy, but inhabited.

Trade.—There is a trade from this river in palm oil and ivory. Four palm oil factories are situated on the north shore about 4½ miles within the entrance, and another factory (Messrs. Miller) is built on a low island 8 cables S. ½ E. from Harrison house, being the outermost and southern of these establishments.

Battery point.—This point is situated 4 miles within the entrance on the eastern side, half a mile S.E. from the island on which Messrs. Miller's factory is built. There is a sand bank between Battery point and the island.

Villages.—There are three villages on the north shore of Benin river, the outermost of which, 1⅓ miles from the entrance, is known as Fish town.

Booby town (Obobi) and Salt town are two villages on the south shore, the former being 1¼ miles S.W. from Battery point, and the latter standing outside the entrance at 3¼ miles S. by E. ½ E. from North point.

Landmarks.—Three white houses on the southern shore outside the entrance, one (the hospital) at a mile to the northward, and the other two at a quarter and half a mile, respectively, to the southward of Salt town, show conspicuously from seaward with the afternoon sun on them.

Miller's factory (on the small island off Battery point) also shows well. Salt town cannot be distinguished.

Northern breakers.—These dangers extend for 2½ miles from North point in a W. by S. direction; they break heavily at half ebb even in fine weather, and there are always heavy rollers upon them.

Southern spit.—The northern edge of this spit forms the prolongation to the south-westward of the shoals extending from the left bank of the river. The western extremity is situated W. by N. from Salt town distant 3 miles, and S.W. ½ S. 3¼ miles from North point. From thence the southern edge trends south-east for 4 miles, joining the shelf of sand and mud, half a mile in breadth, which fronts the coast.

Shoals.—There are two shoals having a depth of 6 feet over them, situated one quarter, and one third of a mile respectively, N.W. by W., and North, of the western extremity of Southern spit.

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* *See* Admiralty chart:—Africa, West coast, sheet XVII., Jaboo to Forcados river, No. 1,862, with enlarged plan of entrance to river Benin; scale, m = one inch. Remarks by Lieutenant A. M. Field, R.N., 1881–2.

Town.—The principal merchants reside at a town locally known as Riverside, situated on the right bank of the Volta, at 1¾ miles within the western entrance; the produce brought down the river is landed at Riverside and conveyed across to Beach town, on the sea coast, for shipment.

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INFORMATION RELATING TO CHAPTER XII.

VARIATION in 1885.

River Benin	- 16° 0′ W.	Niger river	- 16° 0′ W.

76. **CAPE ST. PAUL.—Villages.**—Coasting eastwards from cape St. Paul, after passing Quitta, the second white house seen, will point out the position of Adaffi, situated 14 miles north-eastward of Quitta. The village of Danoe, with a custom house and factory, lies 2 miles eastward of Adaffi, and has a white hut near its eastern extremity. Afloa, at which there are English and German trading stations is 3½ miles eastward of Danoe; Bey-Beach or Lomeh is 3 miles eastward of Afloa; and Bagdad or Bagadah nearly 7 miles eastward of Bey-Beach, thence to Porto Seguro the distance is about 7 miles.*

Afloa is probably the Flohow or Porourah described in the pilot.

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Trade.—There is a trade from this river in palm oil and ivory. Four palm oil factories are situated on the north shore about 4½ miles within the entrance, and another factory (Messrs. Miller) is built on a low island 8 cables S. ½ E. from Harrison house, being the outermost and southern of these establishments.

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Shoals.—There are two shoals having a depth of 6 feet over them, situated one quarter, and one third of a mile respectively, N.W. by W., and North, of the western extremity of Southern spit.

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* *See* Admiralty chart:—Africa, West coast, sheet XVII., Jaboo to Forcados river, No. 1,862, with enlarged plan of entrance to river Benin; scale, m = one inch. Remarks by Lieutenant A. M. Field, R.N., 1881–2.

Sunken wreck.—A wreck with one mast showing above water (in 1881) lies on Southern spit, half a mile eastward of the western extremity; it is situated $3\frac{1}{10}$ miles S.W. by S. $\frac{1}{4}$ S. from North point, and $2\frac{6}{10}$ miles W. by N. from Salt town.

Bar.—Midway between Northern breakers and Southern spit there is a channel half a mile in breadth, and about $1\frac{3}{4}$ miles long, with a general depth of from 8 to 9 feet at low water.

In the rainy season this channel frequently breaks heavily right across, but in the dry season the bar is generally comparatively smooth, with not much scend. Vessels of 11 and 12 feet draught cross this bar, taking it at the last quarter of the flood at spring tides, having regard, of course, to the state of the sea, which should be well considered, as it sometimes unexpectedly breaks with overwhelming force.

The bottom on the bar is of hard sand, changing to soft mud when off it; the swell is nearly end on with respect to a vessel crossing the bar.

Buoy.—A fairway buoy, black, conical, with staff and ball, has been placed in 5 fathoms, with North point bearing N.E. by E. distant $6\frac{3}{4}$ miles. This position of the buoy must not be depended on.

Directions.—The leading mark across the bar of Benin river is Harrison house (easily recognised as being a conspicuous white house on the western shore, the western and largest of four) just open southward of North point, bearing N.E. by E.; this mark will lead over the bar in $8\frac{1}{2}$ feet at low water springs; when about one mile from North point, gradually haul to the eastward, rounding it at the distance of about half a mile, and when it bears N.W. steer along the western shore in from $2\frac{1}{2}$ to 5 fathoms, keeping from 3 to 5 cables from the bank.

Anchorage.—Off Harrison house there is good holding ground in 7 fathoms, about 3 cables from the shore.

It is never advisable for strangers to spend a night within the bar, as the exhalations from the river are notoriously unhealthy, and the musquitos exceedingly troublesome; but should it be necessary to do so, a good berth is in 14 feet, mud, with North point bearing N.N.W. distant 9 cables, and Miller's factory N.E. $\frac{3}{4}$ E.

288. **Benin road.**—In this road, outside the river, much rolling and pitching must be expected, but it affords good holding ground; the most convenient position for anchoring will be found in $4\frac{1}{2}$ fathoms, black mud, with North point bearing N.E. by E., which is on the line of bearing for crossing over the deepest part of the bar.

This anchorage is 3 miles outside the bar, and $5\frac{1}{2}$ miles from the river's mouth. The lower reach of the river will appear open, but from the roadstead the houses are not distinguishable from the deck.

Communication.—Steam vessels run from Bonny (the depôt) weekly, calling at the intermediate rivers Brass, and Nun entrance of the Niger, on the way; they are due at Benin about a week after the arrival of the English mail steam packets at Bonny. p. 288.

Sailing vessels are usually towed over the bar by these local steam vessels, the charge being about 40*l.*, the steamers supplying their own hawsers.

Pilots.—The best pilots are the masters and mates of these local steam vessels. No native pilots are to be obtained.

Tides.—It is high water, full and change, in the entrance of Benin river at 4h. 30m.; springs rise 7 feet, neaps 4½ feet.

The flood stream (December) runs only for 3 hours, at the rate of 3 knots an hour at springs, and the ebb runs for 9 hours at a rate of as much as 5 knots an hour. The discoloured water discharges itself over a range of 9 miles radius from the mouth of the river, and the 100 fathoms line of soundings lies west, distant 28 miles from the shore; the depth increasing from 95 fathoms, black mud, to 119 fathoms.

On the bar, the ebb stream sets to the westward and the flood about E. by N.*

Currents.—The general direction of the current off the Benin is to the S.E., but after the Harmattan has been blowing, it is often reversed, and runs sometimes with considerable strength.

Supplies.—A few supplies can be obtained in Benin river but with considerable difficulty.

Nanna Creek.—At about 18 miles above Harrison house, in Benin river, is Nanna creek, which enters the Benin at Youngtown, situated on the eastern point of entrance. This creek with numerous windings and sharp turns, takes a general south-east direction with depths of from 3 to 7 fathoms, until it joins the Escardos river, near Mugine village. Abreast Youngtown a depth of only 16 feet was found on passing at high water, but there is considered to be a better channel.† p. 288.

Chanoni Creek.—At about 4 miles eastward of Mugine village in the Escardos, is Chanoni creek, with depths of from 4 to 7 fathoms, leading to the Forcados river, which it enters at 10 miles above the mouth of that river.

These creeks are named after the chiefs of the district through which they pass.

The river steamer *Dodo*, drawing 8 feet, passed through these creeks from Benin, and thence to Warré.

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* H.M.S. *Flirt*, 1884, states that on four several occasions when entering Benin river on the flood, the set was towards the northern breakers.

† Nanna and Chanoni creeks from a sketch survey by Lieutenant May, H.M.S. *Flirt* 1884.

COAST.—From the southern entrance point of Benin river the coast trends S.S.W. for 1½ miles, then south for 5 miles, and afterwards S.E. by S.

p. 289. **FORCADOS RIVER.**—This river is about 2½ miles wide, abreast the south point of entrance. Both banks are of moderate height, densely wooded, and bordered by a sandy beach.*

South point.—Beacons.—On South point is a black triangular beacon, 25 feet high, and about one mile S.E. by E. of the beacon is a conspicuous tree, abreast of Golon village. These with Moore and Goshawk points, are useful marks for entering the river.

Moore and Goshawk points.—Moore point is a steep dark bluff, easily recognised, and situated on the north bank at about 4 miles within South point. Two miles eastward of Moor point, and about 13 miles from the bar, is Goshawk point, which slopes gradually to the river, and forms the western entrance point to Chanoni creek.

Bar.—The southern breakers extend about 4 miles N.W. by W. from South point, thence West for one mile. The northern breakers lie one mile northward of the southern breakers, and from 2 to 3 miles off the northern bank of the river. There is said to be a channel between them and that bank, but the channel over the bar between the breakers is the most direct and the one used, and which has a known depth of 16 feet at low water.

Directions.—The position of the best water over the bar, in 1884, does not differ materially from that known in 1869, but nevertheless great care must be exercised in using these directions.

Goshawk point, well open of Moore point, bearing E. by S. ½ S., leads over the bar in 16 feet, midway between the breakers, but Goshawk point being distant 13 miles from the bar, may not be at first recognised. The bar should in that case be approached with the beacon on South point in line with the conspicuous tree abreast the village, bearing S.E. ¾ E., which leads half a mile south-westward of the northern breakers, and when the leading mark comes on it should be steered for as directed. With the conspicuous tree bearing S.E. ¼ E., the bar will have been passed, and the depth will have increased to 4 and 5 fathoms at low water. Course may then be shaped as requisite. There is anchorage off the village abreast the conspicuous tree, in from 4 to 5 fathoms. The inhabitants of this village are friendly.

On the bar, the flood tide sets across it to the northward, the ebb in the contrary direction, which must be allowed for.

Warré.—The town of Warré is situated 3 miles up a narrow creek, about 75 miles above the entrance to the Forcados. A depth of 15 feet was the least water found by the *Dodo* in returning from Warré, but it is believed that a four-fathom channel could be found from the sea to that place.

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* Sketch survey of Forcados river by Lieutenant Pocock, H.M.S. *Goshawk* 1884.

The *Dodo* grounded in the approach to Warré, as well as in the Nanna and Chanoni creeks. The factories formerly established at Warré are all removed to Benin.

NIGER RIVER.*—**Nun entrance.**—Nun entrance lies between cape Nun and Palm point, the former bearing from the latter N.W. by N. distant 1⅓ miles. The shores on both sides are thickly wooded, and are so nearly upon the level of the river as to form a vast pestilential swamp. This entrance somewhat resembles that of the Sengana branch, the latter being not unfrequently mistaken for it. The point of difference between them is that when the rivers are seen from abeam the Sengana entrance points are both bluff, while in the Nun entrance, the eastern point is bluff and the western point a much more gradual slope. In clear weather the factory at Barracoon point would be seen, when the lower reach of the river fairly opens out. p 293.

Palm point.—The eastern entrance point, known as Palm point, is low and densely wooded. p. 294.

A mission house stands on the margin of the eastern shore, one mile north of Palm point, and the village of Akassa is situated a short distance inland.

Cape Nun.—The western entrance point, known as cape Nun, is also low and wooded, but the bush near the point is lower and slopes more gradually than that at Palm point.

Trotter point.—This point, lying on the eastern side of the channel, N. by E. ½ E., distant 3 miles from Palm point, is low, with a remarkable clump of high trees close to its extremity.

Barracoon point.—This point lying N.N.E. distant 2 miles from cape Nun, has on its northern side the United African Company's Factory.

The same Company has also other factories and workshops, half a mile N.N.W. of Barracoon point, these latter cannot be seen from outside the river. There is a small coal depôt here, for the use of the river steam vessels.

Alburkah island.—A wreck marks the tail of the spit extending from Alburkah island.

Western spit.—This spit extends from cape Nun in a southerly direction for 1½ miles, and almost always breaks heavily. The eastern p. 295.

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* *See* Admiralty chart:—Forcados river to cape Formoso, No. 1,863, and Kwara river, Sheet 1, No. 2,776*a*: Also plan of Niger river (Nun entrance), No. 146, scale, $m = 2$ inches. Remarks by Lieutenant A. M. Field, R N., 1881-2.

p. 295. edge is nearly straight and fairly steep-to, the 3-fathoms line being about 1½ cables from the line of breakers, and running parallel to them.

Eastern spit.—The breakers in fine weather and at low-water, extend for over half a mile to the southward of Palm point, but the shallow water stretches three-quarters of a mile further to the southward, forming the Eastern spit, where there are always heavy rollers, within the influence of which it is dangerous for a vessel to get. The south-western extremity of Eastern spit is situated 1¼ miles south of Palm point, from thence it turns sharply to the eastward, following the line of the coast. The western edge is fairly straight, and deepens gradually into the bed of the river.

Bar.—A semi-circular belt of sands and breakers, half a mile in width, connects the Eastern and Western spits, having a general depth of from 7 to 9 feet on the western side, and from 10 to 12 feet at low water on the eastern side, the outermost part of the bar being upwards of 3 miles S. by W. ½ W. from Palm point.

In the rainy season this frequently breaks all over, but in the dry season, when the bar is smooth, it only breaks on the spits and on the shoaler parts of the bar.

The bottom is of hard sand everywhere on the bar, and changes to mud immediately when off it.

Outer anchorage.—A prudent distance to anchor off the Nun entrance is 3 miles from the bar, on the leading mark for the Weather channel in 7 fathoms. This anchorage is very disagreeable, owing to the heavy swell, to which vessels generally lie broadside on in consequence of the easterly current.

Buoy.—A black conical buoy is moored in 17 feet at low water springs, at half a mile W.S.W. from the elbow of the Eastern spit; from it Palm point bears N. by E. ½ E., distant 1$\frac{6}{10}$ miles, and cape Nun N. ¾ W., distant 2$\frac{7}{10}$ miles.

DIRECTIONS.—Weather channel.—To enter by this channel, bring Trotter tree just inside of Palm point bearing N. by E. ½ E. (the buoy being in line with Trotter point); this mark leads over the bar in 9 feet at low water springs. The channel is narrow, having depths of 7 feet at 160 yards on either side of the centre, but it has the advantage of the sea being end on to the vessel while crossing the bar, which is here half a mile broad.*

On deepening the water, borrow to the westward slightly, and steer up in mid-channel for the factories.

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* H.M.S. *Flirt* crossed the bar at three-quarters flood in August 1884, with a depth of 16 feet.

Lee Channel.—This is the best and deepest channel into the Niger river. When approaching from the eastward, after passing Brass river, haul gradually into a depth of 4 fathoms (at low water), keeping along the shore in that depth and steering about W. by N. ½ N., until Sengana point, which makes as a low bluff (the west point of Sengana river being shut in) is sighted on the starboard bow, bearing about N.W. ½ W. p. 29

To enter.—Bring Sengana point to bear N.W., or just open northward of the buoy off the Eastern spit (if in position). This bearing will lead over the bar, which is here three-quarters of a mile wide.

The narrow and shoal part of the channel is passed when the factories open off Palm point.

Pass the buoy off Eastern spit close-to on either hand, and steer up in mid-channel for the factories.

After passing Palm point, a smooth reach of one mile wide, with depth of 5, 6, and 7 fathoms in it, extends for 3 miles to Trotter point, with 4 fathoms within 2 cables of its eastern shore.

The effect of the ebb tide will not be much felt till the river begins to open, when it immediately sets the vessel to the southward very strongly.

Caution.—In usuing both the Weather and Lee channels, the tides should be carefully studied, the best time for entering being during the last quarter of the flood. It should be borne in mind that in bad weather there is a heavy beam sea in the Lee channel, and even in the best and driest season a heavy swell undulates, if not actually breaks, upon the bar.

Anchorage.—The best berth is off Barracoon point in 8½ fathoms, mud, with the centre of the factories bearing West, distant a quarter of a mile, the river entrance being kept well open to get the sea breeze.

Supplies.—The National African Company have a large and well built establishment at Barracoon point, a workshop for the repair of engines, and a small supply of coal.*

Pilots.—No native pilots are to be obtained. The masters of the trading vessels which may happen to be in the river, occasionally act as such, but the most trustworthy pilots are the masters and mates of the branch steam vessels which run weekly from Bonny, and are due from four to five days after the arrival of the outward-bound mail steam packet at that place.

Tides.—It is high water, full and change, in the Nun entrance at 4h. 15m. Springs rise 5 feet. Neaps rise 3½ feet.

The ebb stream runs (December) for 8 hours at the rate of 4 to 5 knots an hour at springs, and the flood for 4 hours at 3 to 4 knots an hour.

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* H.M.S. *Flirt*, 1884.

Wreck.—The wreck of an iron vessel, sunk in 1873, lies in 5¼ fathoms, bearing S.S.E. distant about 4 miles from Palm point. Nothing is now to be seen of her.

INFORMATION RELATING TO CHAPTER XIV.

VARIATION in 1885.

Brass river 16° 0′ W. | Cameroon river 15° 20′.

310. **BRASS RIVER.***—At 9 miles east of Palm point, and 4 miles east of cape Formoso, is situated the entrance to Rio Bento or St. John, more commonly known as the Brass river.

Entrance.—The entrance is three-quarters of a mile wide, and lies between two points, which, when the entrance bears N.N.E., appear well defined, the trees on the western point being more rugged and lower than those on the eastern point.

Within the entrance points, the river expands to two miles in width abreast the factories, which breadth it maintains as far as Opulobo or Big island, situated nearly in the middle of the river, 4 miles from the entrance.

311. **East point.**—The eastern entrance point is densely wooded, the trees extending close down to the water's edge, the sand being gradually washed away by the current, which sweeps round the point with great velocity. The edge of the bush shows as a distinct bluff (slightly cut away near the bottom) from nearly all directions, owing to the sharp elbow formed by the junction of the eastern river bank extending to the south-westward in nearly a straight line, and the line of that coast trending in a S.E. by E. direction for 2½ miles.

West point.—The western entrance point, 1⅓ miles S.W. from East point, is low and sandy, the edge of the bush being 300 yards from high water mark; it appears to be extending to the south-eastward. Though this point is a well defined elbow, yet from its situation with reference to the entrance, it is not so clearly distinguishable from a distance as East point.

Coast.—From West point the coast extends in a W. by N. ½ N. direction for 2½ miles, forming a slight bay before reaching cape Formoso, 3½ miles distant; the line of coast to the northward runs N. by E. ¼ E. for one mile, and forms the right bank of the river, it then turns to the westward (forming a bay 1¼ miles long, and one-third of a mile deep) to Akassa creek, 2½ miles within the entrance. From the point at the mouth of Akassa creek, the right bank of the Brass extends north-eastward to above Opulobo island. . p. 311

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* *See* Admiralty chart:—Cape Formosa to Fernanda Po island, No. 1,357, and plan of Brass river, No. 146; scale *m* = 2 inches. Remarks by Lieutenant A. M. Field, R.N., 1881–2.

Landmarks.—The trees on West point have a very ragged appearance (which assists to identify the river) in contrast to those on the east side, where the tree tops are almost of a uniform height, with no noticeable clumps, except one known as the Haycock (which it somewhat resembles), 4 miles east of East point, and another very remarkable tree with spreading branches, two thirds of a mile further to the eastward. On the west side, Join tree on cape Formoso is remarkable, and also a clump situated 2½ miles westward of West point.

Western spit.—This sand spit extends in a southerly direction from West point for 1¾ miles, with only a depth of one or two feet at low water springs, and always breaks very heavily. The eastern edge is nearly straight and steep-to.

Western breakers.—These breakers are the continuation of Western spit, curving round to the E.S.E. for 2½ miles further, and forming the bar. The shoalest spot is on a large patch, 4 cables long by 1½ cables broad, having only 4 feet at low water on its eastern edge, and is situated 3½ miles S. ¼ W. from East point, and 2¾ miles S. by E. ½ E. from West point.

There are two smaller heads of 5 and 6 feet, situated 3 cables, and 8 cables respectively N.W., and N.W. by W. from the large patch.

The general depths to the westward of these shoal heads are from 7 to 9 feet, and to the eastward from 8 to 12 feet; generally the further east, the deeper the water found.

The patches above mentioned break occasionally at high water, even in the finest weather, and the whole bank breaks heavily at half ebb.

The outer edge of the western breakers is steep, falling suddenly from depths of 6 and 8 feet to depths of 16 feet or more. The bottom is always of sand on the breakers, and of mud immediately outside them.

Hartley bank.—This small detached sand bank, having 11 feet at low-water, and forming the north-east extreme of the Western breakers, is situated 3½ miles S. by E. ½ E. from East point, and 3 miles S.E. ½ S. from West point. In the rainy season, there is always a very heavy break on this bank.

Shore spit.—From East point, off which shoal water extends 1⅓ cables, the line of shallow water (which breaks or not according to the state of the weather and tide) runs in a S.S.E. ½ E. direction for one mile, and then turns S.E. by E. for two miles further, maintaining a distance of about 6 cables from the coast. From this point, it projects to the south-westward towards the line of Western breakers under the name of the Shore spit,

p. 311. the south western extremity being situated 3 miles S.E. by S. from East point, and one mile N.E. ¾ N. from Hartley bank.

The shore spit breaks in fine weather at half ebb, and there are always heavy rollers upon, and to the southward of it, within the influence of which it is dangerous for a vessel, particularly a sailing ship, to get, as both ebb and flood streams set towards the spit.

Bar.—Between these rollers off Shore spit and the Western breakers, a distance of nearly one mile, there is a channel with from 13 to 14 feet at low water springs.

The bottom is of hard sand on the bar, changing to soft mud on either side.

Occasionally, in the wet season, the bar breaks all over, but generally in the dry season the channel is comparatively free from actual breakers during the last half of the flood, though there is usually a long swell. Ordinary boats cannot cross the bar of the river except in fine weather.

Buoy.—A conical buoy, painted black and red in vertical stripes, is moored in 5 fathoms, 1½ miles outside the bar, on the line of the leading mark for entering, and situated 5¾ miles S. by E. ¾ E. from East point.

Caution.—This buoy is sometimes washed away during the rainy season.

Outer anchorage.—Vessels arriving off the Brass river should anchor in 6 fathoms, about 3 miles westward of the buoy. From this anchorage neither houses nor shipping can be seen, and as the report of a gun is not readily heard at that distance from the shore, a vessel requiring a pilot must generally send a boat for one.

Pilots.—Should the usual signals be recognised, a native pilot will come off as soon as the bar is practicable; but the best pilots are the masters and officers of the local steam vessels.

To enter.—The best time to cross the bar is during the last quarter of the flood; vessels of over 16 feet draught should not attempt it.

A range of hills on the west side of Brass river a short distance inland, terminates in a well-defined shoulder, which kept just open of East point, bearing N. by W. ¾ W., leads over the bar (which is here 6 cables in width) in 13 feet at low water, passing one cable eastward of the Western breakers and of Hartley bank.

On this bearing, a peculiar hole in the bushes, just inside East point, is noticeable, and is of itself a good guide, should the shoulder of the hills be obscured. On making sure that the Hartley bank is passed (the water deepening to 16 feet at low water, and the bottom changing from hard sand to soft mud) haul up N.W. ½ N., northward of West point, for 2⅓ miles, when the channel will be fairly open, and course may be altered to N. ¼ E. in mid-channel, giving East point a berth of one third of a mile.

The shore is steep-to, northward of West point, and so also is the eastern side of Western spit, which may be approached with safety. Both flood and ebb streams set strongly towards the eastern shoals; a vessel should therefore keep nearer the west side on entering, which also brings the sea more end-on.

Akassa creek.—The eastern entrance to this creek is 1½ miles N.W. by N. of East point, on the western bank of the river; it affords communication between Brass river and the Nun entrance of the Niger, available for vessels of 6 or 7 feet draught, and is much used by merchant steam vessels trading on the Niger, as the bar of the Brass river is easier to cross than that of the Nun entrance. p. 312.

The chief difficulty in navigating Akassa creek arises from its being so narrow (especially about midway between the rivers) and from the three sharp bends in it.

Boats can cross the flats in Akassa creek not later than three quarters tide. A favourable tide will be carried through all the way by taking care to arrive on these flats at about high water, the ebb tide running out through both eastern and western arms of the creek.

Tua creek.—This small creek on the eastern bank, one mile above East point, leads to Tua town, a large native village one mile inland.

Factories.—Numerous factories, extending about one mile, are built on the eastern shore of the Brass, there being a considerable trade in palm oil and ivory. The upper one (Harrison house) is 1¾ miles above East point. The Mission house is the most southern building, situated 200 yards from the beach, at a quarter of a mile north-eastward of East point.

Anchorage.—Vessels anchor in 4 fathoms, mud, off the factories near Tua creek, about 1¼ miles above East point, and a third of a mile from the shore, looking out to have West point open so as to get as much of the sea breeze as possible.

Tides.—It is high water, full and change, in the entrance to Brass river at 4h. 30m., springs rise 6 feet, neaps 4 feet. The ebb stream sometimes runs as much as 5½ knots an hour at springs, during the rainy season. It generally runs about 4 knots an hour at springs, and the flood tide 3 knots an hour. Both ebb and flood streams set towards Shore spit.

Communication.—Local steam vessels run from Bonny with the mails weekly, being due two or three days after the outward bound mail steam packet arrives at Bonny.

Supplies.—A few fowls and eggs can be procured at Tua town. Fresh water can only be obtained in limited quantities, and depends on the supply the resident traders have for themselves. Rain water is used for drinking, the well water not being recommended. A doctor generally resides at the factories.

p. 313. **BONNY AND NEW CALABAR APPROACHES.***—**Fouché point.**—This point forms the western limit of a large bay or estuary, into which the New Calabar and the Bonny (or Obáne) rivers discharge their waters. It is low and swampy, the edge of the high and thick bush being 2 cables inside the point.

From Fouché point, the coast trends W.S.W. for 2 miles to the eastern entrance point of Fouché creek, which is low and sandy ; the bush being a third of a mile from high water mark. The outer edge of the surf extends 3 cables off Fouché point.

Rough Corner point.—This point forms the eastern limit of the estuary, and is situated E. ¾ S., distance 5¾ miles from Fouché point. The bush extends close down to the sandy beach, and the point appears as a bluff when bearing from N.N.E. to N.N.W. Ju Ju point lies about three-quarters of a mile north-east of Rough Corner point.

Peter Fortis point.—The east extreme of the coast, which divides the mouths of New Calabar and Bonny rivers, is situated N.E. ¼ N. from Rough Corner point, distant 4½ miles. On the extremity of this point are four round trees, resembling haystacks when seen from a distance.

The bottom off Peter Fortis point is covered with long weeds, which are liable to choke the valves of a steam vessel if the point is rounded too closely.

There is a good place on this point, on which to beach small vessels if necessary.

Deadman island.—Deadman point, the south extreme of Deadman island, is a round projection covered with mangroves, nearly midway between Peter Fortis and Calabar points, and situated E. ½ S., distant 3½ miles from the latter, with False Calabar lying between, and hereafter described.

ISLANDS IN THE APPROACHES.—**Sand island.**—From Rough Corner point, an extensive sandbank stretches to the S.S.W., on the western edge of which, a narrow strip of sand half a mile long in a N.N.E. and S.S.W. direction, is not covered at high water. Its northern extreme is situated 1¾ miles S.S.W. ¾ W. from Rough Corner point.

Near Sand island both ebb and flood streams set towards it.

Breaker island.—This island is low and sandy, covered with stunted bush about 10 feet high, with a few mangroves on its northern side, standing on a sandbank which dries extensively at low water.

Breaker island is situated between Rough Corner point and Fouché point, about a third of the distance from the former, and is one mile long from N.W. to S.E., with an average width of 1½ cables. The eastern extreme curves round to north-eastward, following the line of Bonny river, and leaving a channel between it and Rough Corner point 1¼ miles in width. This island has considerably changed both its shape and position in the last few years.

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* *See* Admiralty plan :—Bonny and New Calabar rivers, No. 622 ; scale, $m = 1{\cdot}4$ inches.

Yellow island.—This small sandy island lies in a north and south direction, with mangrove trees in the centre about 30 feet high. It stands on the same large sandbank as Breaker island, but on the extreme western edge. It is situated N.E. by N. from Fouché point, distant 1⅓ miles; N.W. by W. from Breaker island, distant 3 miles, and S. ¾ W. $1\frac{1}{10}$ miles from Calabar point.

BANKS IN THE APPROACH.—Rough Corner Spit.—This spit forms the southern edge of the sandbank off Rough Corner point, from which it is distant 3 miles in a S.S.W. ¼ W. direction; from thence the line of shoal water turns to the eastward, forming the southern edge of Portuguese bank. p. 314.

The intermediate space between Rough Corner spit and Rough Corner point is a long line of broken water.

The southern and western sides of Rough Corner spit are steep-to, and must be approached with caution.

Portuguese bank.—This extensive flat (with from 13 to 18 feet water on it, hard sand) is the continuation to the eastward of the shoal off Rough Corner point, extending 4½ miles from the shore. It frequently breaks all over in the rainy season.

Outer Baleur bank, with from 6 to 12 feet on it at low water, is divided from Portuguese bank by a channel known as the Portuguese channel.

The bank is 2¼ miles long from N.W. to S.E., with an average width of about 2 cables. The shoalest spot is on a sandhead with 6 feet water, near the centre of the bank, and from which Rough Corner point bears N.N.E. ¼ E., distant 6 miles. From this spot a detached shoal of 10 feet bears E. ¼ N., distant 1½ miles.

The whole bank breaks at half ebb, and in rough weather at all times of tide.

Inner Baleur bank.—This bank lies north from the Outer Baleur bank, distant half a mile from its northern extremity. It is a narrow ridge of sand, one mile long in a N. by W. and S. by E. direction, the shoalest part, 8 feet water, being near its southern edge, from which Rough Corner point bears N.E., by N. distant $4\frac{8}{10}$ miles. A shoal with 17 feet water lies N.N.E., distant half a mile from the northern extreme of Inner Baleur bank. From it Rough Corner point bears N.E. ¼ N., distant $3\frac{9}{10}$ miles, and Baleur buoy bears West, distant 2 cables.

p. 314. In bad weather this bank always breaks heavily, and even in fine weather at half ebb.

Buoy.—A red buoy, surmounted with tripod and cage, and moored in 4 fathoms water, marks the north extremity of the Inner Baleur bank. From the buoy Rough Corner point bears N.E., distant 4 miles.

Middle ground.—This bank, nearly 2 miles long from N.W. to S.E., with an average width of half a mile, has 13 feet least water on it, and lies one mile westward of Outer Baleur bank.

The shoalest spot of 13 feet is near the centre of bank, from which Rough Corner point bears N.E. ½ N., distant 6¾ miles, and Middle buoy N.W. by W. ½ W., distant one mile.

Buoy.—A can buoy, moored in 4 fathoms water, marks the western edge of middle ground; from it Rough Corner point bears N.E., distant 7 miles.

Western breakers.—These dangers, triangular in shape, separating Bonny and Fouché channels, are the continuation of the shoals and sandbanks running S.W. from Breaker island, broken only in one place by the Two Fathoms channel. They always break heavily, even at high water in fine weather.

The south-western extreme is situated S.W. by W. from Rough Corner point, distant 6 miles, and S. by E. from Fouché point, distant 4½ miles. From thence the line of breakers runs N.E. by E. for 2 miles as far as the Two Fathoms channel, and the western edge in the direction of Fouché point for 2½ miles, then turning back S.E. ½ E. for 2½ miles and forming the western side of the Two Fathoms channel, thus enclosing a considerable area of broken water. On the eastern side of the Two Fathoms channel the eastern edge of the breakers continues to run N.E., whilst the western edge extends in a N.N.W. ½ W. direction towards Yellow island, the whole of the enclosed space being a large flat, which breaks heavily at half-tide, even in fine weather. It must be remembered that the flood tide in Fouché and Bonny channels always sets towards the Western breakers.

Fouché patches.—These patches have 5 and 6 feet water on them; the easternmost is situated one mile S.S.W. ¾ W. from Fouché point. The three northern patches extend in a W. by S. direction for 6 cables.

BONNY RIVER.—From Ju-Ju point the coast trends N.E. by E. ½ E. for a distance of 2½ miles, to the factories and mission house of Bonny, a large native town. Off Bonny town, four or five large hulks are moored, on board which some of the palm oil traders reside, others being used as depôts. The largest and outermost is the mail hulk, inhabited by the agent of the two steamship companies. Several hulks lie aground on the beach.

Okrika town is situated about one mile up a creek, at the distance of 30 miles above Bonny town, and on the right bank of the river. Abreast the creek the river is about one mile wide, with a least depth of 3 fathoms. There is probably a channel with that depth all the way from Bonny town. p. 314.

Supplies.—Coal.—A coal depôt has been established in the river just above Bonny town, by the British and African steam Navigation Company. A wharf has been built with a depth of 18 feet longside at low water; and an iron pier and coal shed capable of containing about 1,500 tons, with all the necessary appliances for rapid coaling, are on the way out.*

Anchorage.—The anchorage off Bonny town is in 10 fathoms, mud, near the mail hulk, at about half a mile off shore.

Anchorage off Breaker island will be found an agreeable change to a vessel that has been some time in the river. Here there is generally a fresh sea breeze, and plenty of fish may be caught with the seine.

Outer Anchorage.—At no season of the year should a vessel anchor off the entrance of Bonny river in a less depth than 7 fathoms, and Fouché point should be brought to bear North or N. ½ W.; not less than 50 fathoms of cable should be veered. p. 315.

Note.—The hard sandy bottom off this river extends as far as a depth of 6 or 7 fathoms. At this depth off the other rivers in the vicinity, the bottom is invariably of soft mud. In thick weather the Bonny can be recognised by this peculiarity.

Pilots.—The best pilots are the masters and mates of the local steam vessels, who are far better acquainted with the navigation and more trustworthy than the native pilots.

These latter are stationed on Ju-Ju point, and also on Fouché point, and if it can be heard, the usual signal with a gun will be attended to; or a boat may be sent up the river for one of the masters of the merchant vessels generally lying there.

Tides.—It is high water, full and change, off Bonny town at 4h. 50m.; springs rise 6 feet, neaps 4 feet; the ebb stream sets on Baleur bank; the flood stream sometimes sets over the western shoals, but if the outside current is setting strongly to the eastward, the flood stream will be but little felt.

Near Sand island both ebb and flood streams set toward that island.

Bonny Channel.—Buoys.—There are three buoys in this channel, the outer of which, known as the Fairway buoy, is a large black conical buoy, moored in 6 fathoms at low water, and situated S.W. from

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* H.M.S. *Flirt*, 1884.

p. 314. In bad weather this bank always breaks heavily, and even in fine weather at half ebb.

Buoy.—A red buoy, surmounted with tripod and cage, and moored in 4 fathoms water, marks the north extremity of the Inner Baleur bank. From the buoy Rough Corner point bears N.E., distant 4 miles.

Middle ground.—This bank, nearly 2 miles long from N.W. to S.E., with an average width of half a mile, has 13 feet least water on it, and lies one mile westward of Outer Baleur bank.

The shoalest spot of 13 feet is near the centre of bank, from which Rough Corner point bears N.E. ½ N., distant 6¾ miles, and Middle buoy N.W. by W. ½ W., distant one mile.

Buoy.—A can buoy, moored in 4 fathoms water, marks the western edge of middle ground; from it Rough Corner point bears N.E., distant 7 miles.

Western breakers.—These dangers, triangular in shape, separating Bonny and Fouché channels, are the continuation of the shoals and sandbanks running S.W. from Breaker island, broken only in one place by the Two Fathoms channel. They always break heavily, even at high water in fine weather.

The south-western extreme is situated S.W. by W. from Rough Corner point, distant 6 miles, and S. by E. from Fouché point, distant 4½ miles. From thence the line of breakers runs N.E. by E. for 2 miles as far as the Two Fathoms channel, and the western edge in the direction of Fouché point for 2½ miles, then turning back S.E. ½ E. for 2½ miles and forming the western side of the Two Fathoms channel, thus enclosing a considerable area of broken water. On the eastern side of the Two Fathoms channel the eastern edge of the breakers continues to run N.E., whilst the western edge extends in a N.N.W. ½ W. direction towards Yellow island, the whole of the enclosed space being a large flat, which breaks heavily at half-tide, even in fine weather. It must be remembered that the flood tide in Fouché and Bonny channels always sets towards the Western breakers.

Fouché patches.—These patches have 5 and 6 feet water on them; the easternmost is situated one mile S.S.W. ¾ W. from Fouché point. The three northern patches extend in a W. by S. direction for 6 cables.

BONNY RIVER.—From Ju-Ju point the coast trends N.E. by E. ½ E. for a distance of 2½ miles, to the factories and mission house of Bonny, a large native town. Off Bonny town, four or five large hulks are moored, on board which some of the palm oil traders reside, others being used as depôts. The largest and outermost is the mail hulk, inhabited by the agent of the two steamship companies. Several hulks lie aground on the beach.

Okrika town is situated about one mile up a creek, at the distance of 30 miles above Bonny town, and on the right bank of the river. Abreast the creek the river is about one mile wide, with a least depth of 3 fathoms. There is probably a channel with that depth all the way from Bonny town. p. 314.

Supplies.—Coal.—A coal depôt has been established in the river just above Bonny town, by the British and African steam Navigation Company. A wharf has been built with a depth of 18 feet longside at low water; and an iron pier and coal shed capable of containing about 1,500 tons, with all the necessary appliances for rapid coaling, are on the way out.*

Anchorage.—The anchorage off Bonny town is in 10 fathoms, mud, near the mail hulk, at about half a mile off shore.

Anchorage off Breaker island will be found an agreeable change to a vessel that has been some time in the river. Here there is generally a fresh sea breeze, and plenty of fish may be caught with the seine.

Outer Anchorage.—At no season of the year should a vessel anchor off the entrance of Bonny river in a less depth than 7 fathoms, and Fouché point should be brought to bear North or N. ½ W.; not less than 50 fathoms of cable should be veered. p. 315.

Note.—The hard sandy bottom off this river extends as far as a depth of 6 or 7 fathoms. At this depth off the other rivers in the vicinity, the bottom is invariably of soft mud. In thick weather the Bonny can be recognised by this peculiarity.

Pilots.—The best pilots are the masters and mates of the local steam vessels, who are far better acquainted with the navigation and more trustworthy than the native pilots.

These latter are stationed on Ju-Ju point, and also on Fouché point, and if it can be heard, the usual signal with a gun will be attended to; or a boat may be sent up the river for one of the masters of the merchant vessels generally lying there.

Tides.—It is high water, full and change, off Bonny town at 4h. 50m.; springs rise 6 feet, neaps 4 feet; the ebb stream sets on Baleur bank; the flood stream sometimes sets over the western shoals, but if the outside current is setting strongly to the eastward, the flood stream will be but little felt.

Near Sand island both ebb and flood streams set toward that island.

Bonny Channel.—Buoys.—There are three buoys in this channel, the outer of which, known as the Fairway buoy, is a large black conical buoy, moored in 6 fathoms at low water, and situated S.W. from

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* H.M.S. *Flirt*, 1884.

p. 315. Rough Corner point, distant 9¾ miles, and S. ¾ W., distant 8 miles from Fouché point. The Middle buoy is a red can buoy, marking the western edge of the Middle ground; and the Inner buoy (Baleur buoy) is a red buoy, surmounted with tripod and cage, marking the northern extremity of the Inner Baleur bank.

DIRECTIONS.—Having arrived off the Fairway buoy with the Middle buoy nearly in line with Rough Corner point, steer in for the latter bearing N.E. ¼ E. passing westward of the Middle buoy, when abreast which Rough Corner point will be seen open northward of Baleur buoy; continue on the same course, passing westward of the latter buoy, and then haul up N.E. ½ N. for Peter Fortis point, keeping it well open west of Rough Corner point; pass about 3 cables from Rough Corner point, keeping about the same distance off the eastern shore up to the shipping, where there is anchorage in 10 fathoms, mud, near the mail hulk. The least water found will be a depth of 19 feet at low water, which is crossed when north-east of the Middle buoy.

Old Man of War channel.—Vessels leaving Bonny river may cross the bar in 15 feet at low water by using this channel, the southern entrance to which lies 4 miles eastward of Bonny channel; they should drop down with the tide and anchor south-westward of Rough Corner spit, until the next high water, when they may steer S.E. (between Rough Corner spit and Inner Baleur bank) until Square tree (a remarkable clump of trees situated 2 miles westward of Peter Fortis point, shaped at the top like a truncated cone) comes in line with Rough Corner point, bearing N. by E. ¼ E., which mark kept on astern leads over the bar.

In the rainy season it frequently breaks in this channel, but the marks are good and the sea is end on with respect to the vessel.

Portuguese channel.—This channel leads between Portuguese bank to the northward, and Outer Baleur bank to the southward, carrying 16 feet at low water.

Buoy.—A small red conical buoy is moored in 26 feet at low water in the entrance of the channel, 7½ miles S.S.E. ¼ E. from Rough Corner point and 7½ miles S.E. by E. from Baleur buoy.

To enter.—Leaving this buoy on the starboard hand at a distance of about half a mile, and steering N.W. ¾ W., the Baleur buoy will be sighted right ahead, with the conspicuous tree on Fouché point open northward of it. The narrowest and shoalest part of the channel is about 4 miles south-eastward from Baleur buoy, which can be easily seen from that distance, and the conspicuous tree on Fouché point will also be distinguishable on a clear day. When Square tree (Bonny river) and Sand island are in line, haul up N. by W. ⅛ W. for Pyramid tree (a remarkable tree 1½ miles N.E. of Calabar point) to round Rough Corner spit into the Bonny channel.

In the rainy season there is a heavy beam sea throughout the whole length of the Portuguese channel, and it not unfrequently breaks all over, but in fine weather it may be used with safety by vessels of 15 feet draught within an hour or two of high water.

Caution.—Mariners are warned that too greaf reliance should not be placed on the positions or colours of the buoys at the entrance of the Bonny and New Calabar rivers, as they are occasionally either out of position or washed away, especially during the rainy season*; but should the buoys be gone, Rough Corner point, bearing N.E. ¼ E., with Peter Fortis point kept well open west of it, will lead over the bar of Bonny channel in the deepest water; should Rough Corner point be obscured, a vessel must be guided by the Western breakers, which are always apparent, and should be kept at a distance of about half a mile. Steam vessels drawing 18 feet should wait for 2 hours flood to cross the bar; those of 12 feet draught and less, can enter at any time of tide.

NEW CALABAR RIVER.—The western bank of this river p. 316.
assumes a general direction of N. by W. from Fouché point, and is thickly wooded. The shore is fringed by mangroves in places, and elsewhere thick bush grows close down to the water's edge. Several creeks open into the river on this side, those by Young town and Fouché town being the most considerable.

Calabar point.—The southern point of the eastern bank of New Calabar river, known as Calabar point, is situated N.N.E., distant 2½ miles from Fouché point. From here a line of thick, high mangroves extends N.E. by E. for 2¼ miles, to the entrance of False Calabar.

The eastern bank runs from Calabar point in a N. ½ W. direction, and is lined with mangroves and thick bush. There are two creeks at three-quarters of a mile and 2¼ miles above Calabar point respectively, which are said to lead into False Calabar.

Factories.—The factories and oil sheds situated on the west bank, 4½ miles above Fouché point, are painted white, with zinc roofs, and show very distinctly from a long distance. Several hulks are moored off these factories, on board which the traders live. A doctor usually resides here.

Mission houses.—Three white houses are situated on the eastern bank $1\frac{4}{10}$ miles above Calabar point. They can be distinguished on a clear day from a distance of 7 or 8 miles.

DIRECTIONS.—West Fouché channel.—This channel leads between Fouché patches and the land, in 12 feet at low water, but there are no marks, so the eye and lead must be the principal guide.

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* These remarks apply to all the Oil rivers.

p. 316. To enter.—Pass the breakers off the eastern entrance point of Fouché creek, at a distance of about 2 cables, and steer N.E. ½ E. for Fouché point, passing one cable northward of the westernmost of the Fouché patches, after passing which, alter course to E. by N. for the factories at Bonny, rounding the breakers off Fouché point (which are generally clearly seen) at a distance of 2 cables.

Fouché channel.—This channel leading westward of the Western breakers is much obstructed by shoals of 8 to 9 feet water, which break at half ebb in fine weather—the whole channel breaks across in bad weather.

To enter.—The best mark for entering is the River Bluff on east side of New Calabar river, in line with the extreme of the sand off Fouché point, bearing N. ¾ E., with the mission houses open eastward of the point; this leads through in 11 feet. When within 1¼ miles of Fouché point, haul up N.E. by N. for the western entrance of False Calabar creek, passing about a quarter of a mile eastward of the breakers off Fouché point; thence the course is N. by W. ¼ W. 5 miles to the trading hulks moored off the factories. Tombo and Young towns should be passed at the distance of one mile, to avoid off-lying banks.

CHANNELS BETWEEN BONNY AND NEW CALABAR.—

Two Fathoms channel.—This is the only navigable channel over the flats between Bonny and New Calabar rivers, carrying 12 feet at low water. The eastern entrance is situated 2½ miles S.W. by S. of Breaker island. The narrow part of the channel is half a mile long, and about 100 yards broad, on the three distinct bars which have to be crossed.

Buoy.—A conical buoy, surmounted with staff and cage, is moored in 20 feet, at the western entrance of the Two Fathoms channel. From it Fouché point bears N.W. by N., distant $3\frac{1}{10}$ miles; Rough Corner point E.N.E., distant 4¼ miles, and Baleur buoy S.E. ¼ S., distant 1¾ miles.

To enter.—From a position 1½ cables north of Baleur buoy, a remarkable black clump of trees, having a sharp fall on the right, and sloping away gradually on the left, known as Mark tree, will be observed just open northward of the Two Fathoms channel buoy, bearing N.W. Steer for the buoy on this bearing, which leads over the first bar; on deepening the water after crossing, bring Mark tree in line with the buoy. After crossing the second bar, bring Mark tree open southward of the buoy, which leads over the third bar. The three bars are passed when the large clump of trees near Bonny town opens of Rough Corner point.

Having crossed the bars, continue the same course, passing close southward of the black buoy, and southward of a shoal of 12 feet, situated three-quarters of a mile N.W. from Two Fathoms channel buoy; when yellow island closes the east bank of New Calabar river, haul up N. by W. ¼ W. in mid-channel for the hulks off the factories.

Boat channel. — This channel leads between Bonny and New Calabar rivers, across the flats northward of Breaker island and Yellow island. Pass about half a mile north of Breaker island, steering for Yellow island, and when within one mile of the latter, and near the line of breakers off its southern extremity, steer for Calabar point.

The most dangerous part of the flats is in this vicinity, and it usually breaks at half ebb.

Care is required in using this channel, as a beam sea is experienced the whole way, which sometimes unexpectedly breaks heavily. In bad weather it breaks all over and is quite impracticable.

Cawthorne channel (False Calabar).—From a recent examination of False Calabar river, which lies between Deadman island and Calabar point, a new Channel, named Cawthorne channel, has been found, by which vessels can proceed from Bonny to Calabar at all times, without re-crossing Bonny bar to enter by Fouché channels.* The new route is somewhat longer, but it offers smooth water, is deeper, and can be taken when perhaps the bar cannot be attempted. It is not advisable to take it without a pilot.

Directions.—From a buoy moored about one mile N.W. by W. ¾ W. from Rough Corner point, steer N.N.W., with the north point of Deadman ahead, or a trifle on the starboard bow; two other buoys (if in position) will be found on this course, at one and two miles respectively from the first mentioned. When Peter Fortis point comes in line with the point eastward of Deadman island, course should be altered for the middle clump of trees, bearing N.N.W. ¾ W., passing the breakers on the port hand, at the distance of about 50 yards, and thence close to the shore near the clump. A mid-channel course may then be taken until near the junction of the channel with New Calabar river, when the north shore should be kept aboard, to avoid the spit which appears to extend about half a mile northward of the south point of entrance, and marked by a red buoy. Here the channel is between the red buoy and two black ones on the starboard hand, and is rather a sharp turn.† Thence to the hulks off the factories a mid-channel course should be taken.‡

COAST.—From Rough Corner point the coast trends S. by E. one mile, and then turns E. by S. ½ S.; it is low, swampy, and covered with mangrove, palm, oak, and such trees as grow in brackish water. Fertile land, more elevated above the sea, lies several miles inland.

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* Examination made by Captain Cawthorne, of the African S.S. Company, 1884.

† H.M.S. *Flirt*, July 1884, found but 20 feet here, but there is probably deeper water.

‡ It is stated in the Pilot, page 316, that "the river above New Calabar town is apparently much obstructed by shoals."

When passing along the coast between Bonny and Opobo rivers, vessels should keep outside the depth of 8 fathoms.

OPOBO RIVER.[*]—This river, lying 32 miles eastward of the entrance to Bonny river, is not conspicuous when seen from the offing; but the white factories, with their galvanised iron roofs, situated on the east bank 1¼ miles within the entrance, are visible in clear weather from a distance of 6 or 7 miles.

Trade.—King Ja-Ja, the most powerful and influential chief in this district, resides at Opobo town, which from its position with respect to the creek leading to the Bonny river entirely commands the approach to that river. Hence the palm oil coming down Opobo river from the large markets in the interior, which used formerly to be sent to Bonny is now shipped in considerable quantities direct from Opobo.

Factories.—Five factories are situated on the east bank of the river abreast Sandy point; that belonging to Messrs. Miller is on the opposite side.

West point.—This point forms the western entrance point of the river, from which the coast trends N.E. by N. for a distance of 2¼ miles to Sandy point, on which stands Sierra Leone town, chiefly composed of native huts with one or two white oil sheds. From Sandy point, the line of the river turns abruptly N.W., with an average width of three-quarters of a mile, both shores being lined with impenetrable mangroves.

East point.—This point, forming a tolerably sharp elbow, is situated E.N.E. from the beacons on West point, distant 1½ miles. From East point the river bank trends N.N.E. for one mile to the factories abreast Sandy point, where the stream is half a mile broad. From the factories the river bank curves round to the north-westward, which direction is continued as far as Opobo town, situated on the right bank, and distant about 4½ miles above the factories.

p. 317. **Bar.**—The bar of Opobo river is very shoal, and breaks all over in bad weather.

From West point shallow water extends southward for nearly 2 miles, and then gradually curving round to the eastward meets the shoals running southward from Eastern spit, thus forming the bar.

The shoalest part is on a large patch one-third of a mile long by about 1½ cables broad, with from 4 to 5 feet on it at low water, and situated S.W. by S., distant 1½ miles from the beacons on West point.

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[*] *See* Admiralty plan:—Opobo river, No. 628; scale, $m = 2$ inches. Remarks by Lieutenant A. M. Field, R.N., 1881–2.

Another smaller patch of 4 feet water lies a quarter of a mile S.E. by E. from the larger patch, and a small sandhead of 6 feet depth is situated one-third of a mile S. by E. from the latter. These patches break at half ebb even in the finest weather.

To the westward of the Direct channel the general depth on the bar is 7 feet at low water, and the same for a distance of half a mile to the eastward of this channel, but further to the eastward the depths gradually increase, reaching the maximum of 10 feet on the leading mark for the East channel, and decreasing to 8 and 9 feet when yet more to the eastward.

Patches of 6 feet at low water extend south-west from West point for 8½ cables.

The bottom is of sand everywhere on the bar, changing to mud on either side. The bar is said to frequently shift its position.

Eastern spit.—This spit extends in a south-west direction from East point for 1½ miles, leaving a deep channel between its western edge and the west bank of the river, one-third of a mile broad.

It is nearly dry at low water springs, and always breaks very heavily on the outer edge. The western and north-western edges are steep-to, but it shelves very gradually on the south and south-east sides, with heavy rollers for a considerable distance even in smooth weather.

Sailing vessels, if rounding Eastern spit too closely, are liable to be swept on to it, during the flood tide, and an anchor will not readily hold when among these rollers.

Beacons.—On West point is situated a white conical beacon, 120 yards from the beach, and S. 28° E. from it, distant 80 yards, is a whitewashed pole. The beacon kept open southward of the pole leads clear of the shallow water extending southward from the eastern spit.

Buoys.—A black fairway buoy in 3¾ fathoms, lies on the inner edge of the bar, with West point beacon, bearing N. 15° W. distant three-quarters of a mile.*

A black conical buoy, surmounted with staff and ball, is moored in 10 feet water, marking the south-eastern edge of the shallow water extending from Eastern spit. From this buoy the beacons on West point bear N.W. by N., distant 1½ miles. The buoys are not to be depended on.

DIRECTIONS.—Direct Channel.—To enter.—The apex of a clump of trees, known as Foster clump (which will be readily recognised), situated three-quarters of a mile north of the Factories on the east bank, should be brought in line with a small white house on the end of the pier at Sierra Leone town, bearing N.N.E. ¼ E., this will lead over the bar, which is here half a mile broad, in 10 feet at low water springs; the channel for that depth is however very narrow, and the leading mark must be very carefully kept on, there being a shoal of 6 feet 150 yards westward of that line. It is therefore not advisable to take this channel without the assistance of a pilot. The sea is end on to a vessel when in the channel.

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* The red beacon buoy placed on the bar, was not in position in 1884. From Senior Officer, west coast of Africa, 1884.

Eastern Channel.—Miller's factory (on western bank of the river) bearing N. ¾ E. leads through in 10 feet at low water springs; when within 3 cables of the buoy, haul up N.N.W. ½ W. for the beacons on West point, the pole being open north of the inner beacon, this mark leads south of Eastern spit, and when Foster Clump comes in line with the right extreme of Sierra Leone town, haul up in mid-channel for the factories.

The Eastern channel is much wider than the Direct channel, but it has the disadvantage of a beam sea; the bar is a mile wide, but the channel when buoyed is recommended for strangers in preference to the Direct channel. The best time for entering is at the last quarter of the flood.

Anchorage.—Vessels should anchor in 8 fathoms stiff mud, off the Factories. Mooring buoys are laid down off the different wharves for the convenience of vessels belonging to the traders.

Outer Anchorage.—The usual anchorage outside the bar is in about 5½ to 6 fathoms, about 4 miles S.S.W. from West point, from which anchorage the factories will be clearly seen. The prevailing current being to the eastward, vessels nearly always lie broadside to the swell.

Pilots.—When requiring a pilot, the fore top gallant sail should be loosed as a signal. The best pilots are the masters and mates of the branch steam vessels.

Communication.—Branch steamers run weekly between Bonny and Opobo rivers, and may be expected a day or two after the arrival of the English mail at the Bonny river.

Caution.—Great care should be taken at all times when standing in for Antonio and Opobo rivers, as shoal ground extends several miles off shore between them, and the flood tide often draws a vessel in at the rate of 2 miles an hour; all danger may, however, be avoided by paying attention to the lead, and not shoaling the water under 7 fathoms.

Tides.—It is high water, full and change, in Opobo river at about 4h. 30m.; springs rise 7 feet, neaps 5½ feet. The tidal streams set fairly into and out of the channels over the bar.

OLD CALABAR RIVER.—**Buoys.**—The only buoys *seen* by p. 319. by H.M.S. *Flirt* in November 1884, when entering Old Calabar river, were, a red buoy lying with Tom Shot's point bearing W. by N. distant about 3 miles; and the black buoy, with staff and cage, lying with Tom

Shot's point bearing W.S.W. about 6 miles, and Green patch point N. ½ E.*

CAMEROON RIVER.—Suellaba point, the south point of entrance to Cameroon river, is reported to have extended considerably in a N.N.W. direction, and that trees are growing within 200 or 300 yards from its extremity.†

Old Hole point.—The bank fronting the shore off Old Hole point has extended. There is a depth of 3 feet only on its outer edge, at 7 cables E.S.E. of the point. Rugged point kept to the northward of the bearing W. ½ N., leads southward of the bank.

Mungo river enters the Cameroon just below Hickory town, and down which most of the ivory is brought for trade.

Directions.—For lines 20 and 21, *read*, East; then steer for Doctor point until Hole creek is well open, bearing N.N.W., when Hickory point will bear N.E. by E. and should be steered for on that bearing, until Rugged, &c. p. 328

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* *See* Admiralty charts:—Cape Formosa to Fernando Po island, No. 1,357; and Old Calabar river, No. 149. *See* Caution on page 31.

† *See* Admiralty chart:—Cameroon river, No. 1,456; scale *m* = 0·5 of an inch.

A LIST OF ADDITIONS AND

(*Corrected to*

EMBRACED

AFRICA PILOT,

Page of Sailing Directions.	No. in Light list.	Name of Light.	Place.	Latitude.	Longitude.	Number and Colour of Lights.		Character of Light. (F.Fixed.)	Interval of Revolution or Flash.	Miles seen in clear weather.
				North ° ′	West ° ′					
22	—	AZORES, FAYAL -	On breakwater constructing in Holta bay.	38 32	28 38	1	Red.	F.	- -	7
49	—	TANGIER BAY -	On battery at S.E. corner of sea wall.	35 47	5 48	1	Red and White.	F.	- -	5
			Landing stage -	—	—	1	Green.	F.	- -	3
109	3	CANARY ISLANDS, LANZAROTE ISLAND.	Naos port - -	28 57	13 33	2	Red and White.	F.	- -	6
124	12*a*	SENEGAL. (Fr.) -	North point of Ile -	- -	- -	1	- -	F.	- -	- -
137	12	C. VERDE ISLANDS. ST. ANTONIO ISLAND.	Punta do sol (North point).	17 12	25 6	1	Red.	F.	- -	3
140		PORTO GRANDE, ST. VINCENT I.	Bird island - -	16 55	25 1	1	White.	F.	- -	14
			Custom house pier	16 53	25 0	1	Red.	F.	- -	3
151		PORTO PRAYA, ST. JAGO ISLAND.	Temerosa point -	14 53	23 31	1	White.	F.	- -	13
			End of town mole -	- -	- -	1	Red.	F.	- -	10
			End of pier - -	- -	- -	1	Red.	F.	- -	3
152		FOGO - - -	Fort Carlotta on W. side of island.	14 52	24 30	1	Red.	F.	- -	3
153		BRAVA - -	On Jalunga point, E. side of island.	14 50	24 40	1	Red.	F.	- -	3
282	26	LAGOS - - -	East entrance of lagoon.	6 24	East 3 27	1	White.	F.	- -	10

ALTERATIONS TO LIGHTS

May 1885.)

BY THE

PART I., 1880.

No.	Colour, or any Peculiarity of Light-house.	Height in feet, Centre of Lantern, above High Water.	Height in feet of Building from Base to Vane.	Year lighted.	Character and Order of Illuminating Apparatus.	REMARKS.
--	Post.	28	13	1882	- - -	Fifty yards within the extremity of the breakwater. Reported as scarcely visible.
—	Circular, white.	58	- -	1883	C. D. 5th Ord.	*Red* from S. 17° W. to S. 72° W. *White* from S. 72° W. over Tangier road.
—	- - - - -	20	- -	1883	—	
3	- - - - -	47 35	20	- -	D.	Northern light *red*, southern *white*, about 160 yards apart. In line N.N.W. ½ W., lead through S.E. entrance to port.
12*a*	- - - - -	- -	- -	- -	D. 2nd Ord.	*Proposed.*
12	Masonry pillar.	23	- -	1883	- - -	A guide to the anchorage.
	Circular, Iron.	306	40	1882	D. 4th Ord.	Visible from the northward between S. 32° W. and N. 81° W., and from the southward between N. 75° E. and S. 71° E.
	Iron support.	16	- -	1881	—	
	Octagonal, white.	85	54	1881	D. 4th Ord.	Quail island lights are discontinued.
	- - - - -	- -	- -	1876	—	
	- - - - -	23	- -	1881	- - -	*Provisional light.*
	- - - - -	116	10	1881	- - -	A guide to the anchorage.
	- - - - -	50	10	1881	—	
26	Mast.	70	58	1884	- - -	Visible seaward between the bearings of E.S.E. and W.N.W

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